Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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With the Editor

JUST when so much furniture and so many automobiles of medium grade and price began to look alike, out flashed several new and daringly different designs.

Leaving an exhibit of new motor cars where many people of many minds were assembled recently, one typical man of the street made this comment: "Well, the new lines have either spoiled the car or they represent a new style which is going to be popular and widely copied; it depends upon which way you look at it. Some people like it, but others do not!"

The same comment applies to the new Art Moderne designs in furniture. Americans have become accustomed to seeing and experiencing changes in the established order of things. To interest them in buying, manufacturers must periodically offer something new, different and better—and those who are eminently successful, are doing it. To the uninformed, it is a real problem to figure out what to offer to stimulate interest and to satisfy the demand for something new, but today this element has become a powerful factor in the success of all manufacturers whose finished articles are sold to the public.

Design, finish, color and decorative treatment carry real weight and responsibility. They afford the chief sales appeal and they must be effective to command attention and hold interest. Considerable space in this issue, therefore, is devoted to revealing interesting features of the latest furniture exhibited at Chicago and Grand Rapids during the mid-summer shows. These articles contain suggestions that are significant and informative of present and future trends in the furniture industry and allied lines.

W. H. Rohr

Managing Editor

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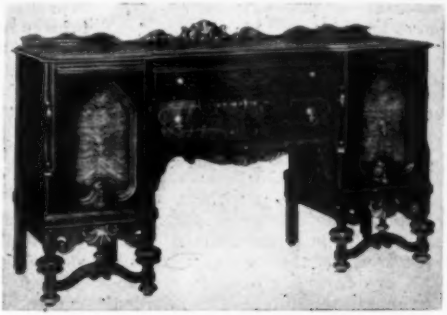
May we show you how well Berryloid will fit into your production and sales operations? Our experts will gladly demonstrate.

BERRY BROTHERS
Varnishes Enamels and Lacquers
Detroit, Michigan *1858—70th Anniversary—1928* *Walkerville, Ont.*

An expert observer's notes, revealing the Art Moderne effects incorporated in the design, finish and decorative effects of furniture exhibited at the Chicago exhibition. A general survey, with many details included.



Chicago Furniture Show Finishes

By R. G. Meade

WITH MINOR variations in design you can take a piece of walnut or walnut and gum furniture and give it a considerable number of finish effects. You can bleach it a French walnut, stain it a dark Spanish Renaissance color, give it a gray, yellow, reddish, or greenish tone, shade it heavily or fog it ever so gently, rearrange butt, crotch, straight grain, burl and pencil stripe veneers in various combinations.

You can add vein lines, overlays, fret work, half rounds, stencil designs, inlay, marquetry and carvings and adapt any of a dozen periods, or set off the walnut with an array of fancy woods stained or shaded to harmonize or contrast.

But, after you've done this for six or eight seasons—taxing the combined genius of designer and finisher—the end of the rope is about reached. This is the condition which obtained at the close of the Mid-Winter Market at Chicago in 1928, leaving it to Providence either to inspire something new or leave the furniture industry in the doldrums. Now doldrums being bad for any industry, and the automobile and radio industries being very active and successful in appealing to the American purse, Providence evidently decided to be kind—and it inspired "Moderne."

It is no more criticism of Louis XVI, Hepplewhite, Adam and Queen Anne to say that they have served their time in the Twentieth Century than it would be to say that sailing ships, spinning wheels, and sedan chairs should be retained with them because they are also graceful and beautiful.

Civilization and industrial accomplishment have advanced so rapidly in the last 25 years that we have failed to realize that a change in artistic viewpoint was bound to develop with it. Therefore, do not say that Moderne is a fad, an artificial creation to stimulate a jaded public appetite, but stop and realize that it is as

Photograph at top of page. Courtesy of Endres-Tompkins, Rushville, Ind.

natural in this age as skyscrapers or radio.

Moderne at Chicago

In point of design, Moderne at the Chicago market runs the gamut from the most bizarre of European interpretations to the most liveable of American types. Scarcely a space is without an example, some cautiously put forth, others boldy proclaimed and featured as the "coming thing." All are curiously alike in distinctiveness, yet different in detailed treatment; the effect on the observer is to make the conventional styles of walnut, mahogany, and maple seem colorless and old fashioned.

The bedroom lines are apparently hesitant to accept Moderne and the few suites seen are strongly modified. One shows a square design with curly-maple center panels stained almost a black, with silver (aluminum bronze) posts and rails, small drawer fronts in satinwood natural veneer and silver drop drawer pulls. Another shows pencil-stripe walnut veneer, bleached; ebony posts, thuya wood drawer fronts, and drop drawer pulls in bronze.

Photograph, courtesy of Endres-Tompkins

Moderne in Dining Room

In the dining room field, at least one Moderne suite is featured in practically every space, with considerable variety in design. The square contour prevails with curves in complete semicircles rather than broken. Legs are of the fluted peg-top variety for the most part, tapering to slenderness at the bottom and often with ivory or silver mountings. Some supports, however, are square, tapering or bowed in semicircles or flaring as in Duncan Phyfe. The finish luster ranges from almost dead flat to a bright polish.

To cite a few examples as to veneer and finish, we note one combination of satinwood top with narrow ebony inlay all around, zigzag bleached-walnut veneer on large drawer fronts, ebony rails and posts, ruby red mahogany legs, the flutings lined in black and mounts and drawer pulls of silver (aluminum bronze). Another shows ivory marquetry inlay on a background of dark burl walnut, rosewood tops, zebra wood sides and rails, dark reddish brown fluted legs, the flutings faintly lined in antiqued ivory. This suite is somber in general tone, but lightened for contrast by the skillful use of ivory with a most dignified result.

Still another is veneered on all large spaces with rosewood, stained a deep red tone, rails and dividers being alternate black enamel and ivory, the rosewood veneer inlayed with cherry burl and zebra wood in a sunburst ef-

fect. The square legs are of rosewood and in design they are considerably modified from pure Moderne. A very light suite shows alternate parallel veneers of zebra wood, curly and birdseye maple veneer, all of the palest tone and with ivory drawer pulls; it indicates an example of harmony rather than contrast.

In a neighboring space the use of curves is pronounced, the top and side veneers being straight-grained deep-red mahogany; the fronts are rosewood and cherry burl. Corners and centers are decorated with festoons and loops alternately painted black, green, and ivory.

Moderne Elsewhere

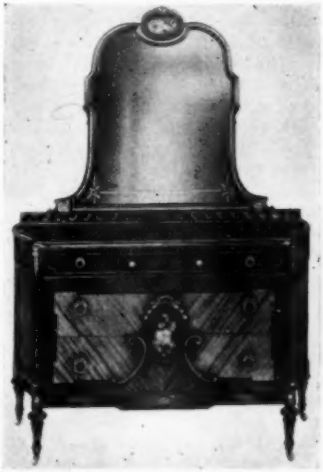
Moderne reaches its greatest popularity in the living room, upholstered and reed furniture groups. One bookcase stands out in very light curly maple with ebony tops, zebra wood trim, gum interiors, and silver drawer pulls. A desk showed mahogany and rosewood in diamond veneers with ebony rails and posts.

A table with thuya wood top is inlayed at the center with a satinwood sunburst effect, the semi-circle supports of ebony. A stepped-up book rack is of plain straight-grain walnut, without shading or decoration, American walnut in color. A painted round table is effective in black, the top shaded in a sunburst silver pattern.

Apart from a few rather bizarre magazine racks and humidors, little painted Moderne is shown, and that chiefly in combinations of two-tone—green and silver, black and silver, red and black, ivory and black, blue and cream—all without shading.

Cedar Chests and Reed Furniture

Among the cedar chests, at least one tentative design is shown in Moderne in each space, all of them strongly modified. One shows pencil-stripe walnut



Photograph courtesy Rushville (Ind.) Furniture Co.

trimmed and overlayed with pale birdseye, sycamore, and rosewood. Another shows bleached straight-grain walnut top, brown walnut sides and bun feet, dark brown mahogany border inlay. Still another is veneered in light-brown mahogany top, diamond walnut-veneered overlay on the front and fluted red mahogany legs.

The reed furniture lines feature Moderne strongly and three effective stick suites are worthy of special description. The first is natural shaded in green, book shelves forming the sides of chairs and settee. The second shows diagonal weaving of the stick reed, natural finish, with silver and red cushions. The third includes an

octagonal table top with shelves at the angles; a lounge chair has no side frame, the upholstery being red and the finish green and silver two-tone.

The Conventional Styles

Innovation having reached its limit in the older styles. It is only necessary to report in general. In the bedroom groups there appears to be less scroll overlay, smaller turnings, shading confined more to legs and overlay with a leaning toward crotch mahogany and pencil-stripe walnut, as against other veneer figures. One striking suite is of straight-grain walnut and quartered oak, finished in a dull gray one-tone brown.

The normal number of painted bedroom suites are observed with somewhat less shading and greater trend toward two-toning; for example, silver fawn and black, rose parchment and maroon, ecru brown and dark brown, grass green and red gold, jade green and ivory, ivory and olive green. All are decorated and some are shaded. One suite of satinwood is trimmed in jade green with white glass drawer pulls.

In the dining room suites Moderne influence is at work, tending toward plainer contours, less carving and more profuse use of fancy veneers. Straight-grain walnut and mahogany replace to a greater extent the overworked butt and burl walnut and crotch mahogany, except as the latter are employed for contrast purposes. A considerable amount of mahogany is observed with less carving and considerably less shading on tops and fronts. Little change is noticeable in walnut color; mahogany is a lighter reddish brown. Ebony and cherry burl constitute the favored trim woods with some curly maple.

Other Groups

In the novelty field, painted effects, particularly oriental and floral decorations, have disappeared in favor of straight walnut, mahogany, or maple, with some shading and a certain amount of two-toning.

The metal beds continue to duplicate in graining anything which can be done in wood, down to the most delicate shading and elaborate marquetry and fancy veneer effects. Moderne in the metal beds has taken hold, more particularly in two-tone, silver and green, black, red, or dark blue, without shading.

Refrigerators and kitchen cabinets show more two-tone and one color effects, with stencil decorations and less shading and frosting than heretofore. Crystal green, light ivory, white and gray, pink and strawberry, light tan and brown prevail as color combinations. The breakfast room suites harmonize with these in lighter tones, with considerable trend at the same time toward brown shading on natural backgrounds.

Richard Zeller Leaves Zeller Lacquer Mfg. Co.

Richard Zeller, 100 Jefferson Ave., Maplewood, N. J. has announced his resignation as Secretary and Director of The Zeller Lacquer Mfg. Co., Inc., 20 East 49th St., New York City, and has severed his relations with Hugo Zeller and his brother Gustav O. Zeller.

Richard Zeller's father, the late G. O. Zeller, was one of the pioneers in the lacquer industry and was one of the founders of The Egyptian Lacquer Mfg. Co., of which Richard Zeller was Works Manager, Director and Secretary for many years. After leaving The Egyptian Lacquer Mfg. Co., he and Hugo Zeller and his brother Gustav O. Zeller founded The Zeller Lacquer Mfg. Co., of which he was Works Manager. His future plans have not been made, but he is going into the lacquer industry again very shortly.

How to manage the automobile refinishing shop in such a manner as to give complete customer satisfaction, thereby building and holding a reputation for prompt delivery and high-grade workmanship.

Custom Automobile Finishing

By Joseph F. Schmoegner

THE FIRST aim in operating a shop doing automobile finishing is to secure sufficient work to keep busy—profitably. Effective continuous advertising is essential to attract customers to the shop. Soliciting by competent salesmen is another medium for securing work, but satisfactory work at moderate prices—provided the average automobile owner is catered to—will do a great deal toward keeping the shop running most of the time.

Every shop owner should endeavor to build up and hold a good reputation for quality work and moderate prices. A good reputation is the foundation of every thriving business establishment.

Honest Estimation

Estimating honestly and giving the customer all that he is paying for should be an established policy. Estimation on "clean-off-to-metal" jobs should always be clear, so that the customer will know what parts of the car are to be cleaned down to the metal. It will save a lot of argument if explanation is made to the customer that baked enameled fenders, running boards, guards, hoods, lamps and parts originally finished with baked enamel, should not be cleaned off, as this foundation will serve very well for either a varnish or a lacquer finish.

Inviting the customer to view his car in cleaned-off condition will often eliminate any existing doubt he may have in regard to the organization's reliability in business transactions. In fact an invitation extended to customers to visit the shop and watch the progress of cleaning and finishing operations should prove beneficial in establishing their confidence and good will.

Practically every man who orders his car refinished will be interested in seeing the transformation being accomplished, and it is more than likely that he will speak to his friends about the finishing work. This is good adver-

tising for the automobile refinishing shop. A satisfied customer is a good booster for the finishing shop and many of his friends and acquaintances become boosters.

Promptness in Delivery

Promptness is another requirement that will add substantially to the good reputation of a finishing shop. A makeshift promise for delivery that cannot be kept

Using the spray gun attached to cup of material, for final work on typical refinishing job.

will often prove so disappointing to the customer that the effects of a really beautiful finishing job are virtually lost so far as his complete satisfaction and good will are concerned. It is much better to have the car finished ahead of time than to disappoint the customer on the delivery date. During the several years that I have managed a custom paint shop, I have had more comments of appreciation on prompt deliveries than on the quality of the work turned out.

A few simple rules, if watched closely, will soon reveal the secrets of prompt delivery. First, work should begin immediately—in fact in the presence of the customer if possible. Second, replacement jobs or nickel plating should be taken care of at once. Third, make sure that the colors selected will be on hand when wanted. If there is any doubt about being able to secure the colors in time, it is far better to notify the customer than trust to luck in getting them.

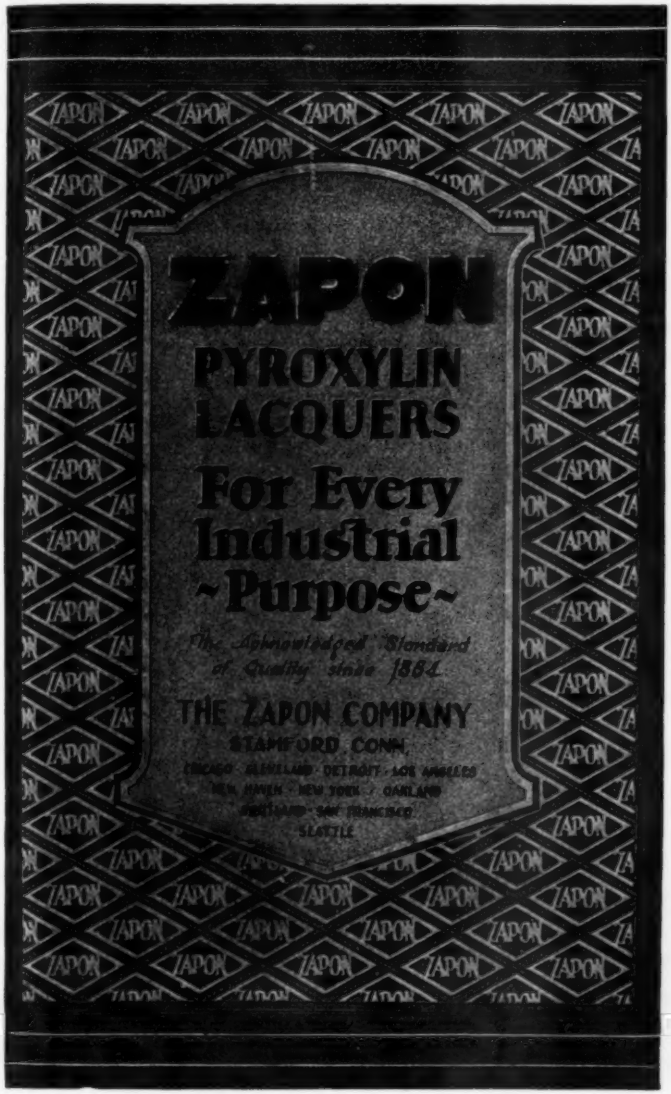
A progressive finishing establishment with intentions of growing, will not necessarily confine its activities to refinishing. Its services can be profitably enlarged to include upholstery, top work, nickelplating, motor cleaning and painting, replacement of broken glass panels or perhaps equipping the car with new accessories, new tires, tire covers, etc. Once a customer is obtained, it is good business to sell him what you think he needs—not merely what he happens to remember he needs. Learn to sell him 100 percent service.

All sales should be recorded on a triplicate order blank. They should be itemized properly, showing charges plainly. Charges are better not added in a lump sum, as it will often lead the customer to request, or even demand a cut in prices.

After Finishing

After completing the finishing job there are still some important points that should not be overlooked. Put the car in presentable condition for a show window! Clean the window panes, the running board covering, the aluminum mouldings and the tires. Make sure all nickel is polished. Clean the inside of the car thoroughly with a vacuum cleaner. Burn a small amount of incense inside the closed car. Be sure that all lights are in proper working condition.

In other words, the car that is ready to turn over to the customer should give the impression of being a brand new automobile. If the finishing establishment succeeds in doing this, it is a wonder-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ful advertising medium which should bring at least one new customer.

This method of doing business is the most satisfactory and profitable to all concerned. Be always eager and sure to give what you have promised and make deliveries on time. Invite your customers often; meet them with a smile and see your business grow.

Color Materials for Paints and Lacquers

Coloring matter can be conveniently divided into five general groups, as follows:

1—The earth colors or natural mineral pigments: These are the umbers, ochers, siennas, English vermilion, etc. Their preparation for the market usually requires removing dirt from the natural deposit, washing, drying and sometimes calcining.

2—Fire process pigments: Ultramarine blue, lead oxides, some English vermilion and many of the iron oxides are in this class. These are made by roasting or combining various products in furnaces at high temperature.

3—Fume pigments: Lamp black, bone black, ivory and drop blacks, etc. These are made from the carbon produced by the incomplete combustion of carbonaceous materials.

4—Inorganic chemical pigment colors: The chrome yellows, zinc and cadmium yellows, chrome scarlets, iron blues and chrome greens are all in this class. These are produced synthetically.

5—Lake and pigment dyes: These are subdivided into four groups.

A—The lakes produced from the dyes extracted from the various natural-occurring plants, woods, insects, etc., such as madder, logwood, cochineal, indigo, and many others. Their use is rapidly disappearing due to the superiority of the aniline colors.

B—Pigment dyes: These are coal tar and dyes which, having no active salt-forming groups, produce by direct combination, naturally-insoluble pigments such as paratoners and toluidine toners.

C—Lakes: Soluble coal-tar acid dyes rendered insoluble by their chemical combination with a base, or their precipitation with a metallic salt of barium, calcium, lead, etc. These differ from group B, in that they have active salt-forming groups, in addition the auxochromic groups.

D—Lake: Soluble coal-tar basic dyes having salt-forming groups. These are made insoluble by precipitation with tannic acid and tartar emetic.

These lakes, as a class, while of great brilliancy and range of shade, are very much more fugitive than the acid lakes and also dry poorly. Recently, new mordants have been developed which produce considerably more permanent lakes, with however, a slight sacrifice in brilliancy.

Berry Bros. New Aeronautical Representative

The Aviation Division of Berry Bros., Inc., Detroit, Mich., announces the appointment of Thomas A. Murphy as Aeronautical Representative with headquarters at Detroit.

Mr. Murphy's experience in aviation dates from 1916, when he attended the Naval Aviation School at Pensacola, Fla. In 1921 he joined U. S. Inspection Service of the Air Corps and since that time, has done valuable work for the Government at the large aircraft plants throughout the country.

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An Impervious Varnish, Japan or Lacquer is especially made for a specific purpose for finish on Iron, Steel, Copper, Aluminum or Wood.

"You may rest assured that your editorials are read, judging by the promptings which have come to me to comment on your editorial in the May issue, 'Gold Leaf; Gold Sizing for Lacquered Surfaces.'

"The importance of the problem is so vital to your readers that I am sure the knowledge of a solution for it will be more so."—

Paul S. Kennedy
Vice President

Sizing Lacquered Surfaces to Take Gold Leaf and Decalcomania

Vice-President of Murphy Varnish Co. submits information in reference to permanently attaching gold leaf and decalcomania decorations to surfaces finished in lacquer, as mentioned editorially in May issue

By Paul S. Kennedy

THIS PROBLEM was first called to the writer's attention by railroad officials, and we have to thank the Master Painters of a great Eastern System; a great Southern System; a great Western System, and a great Coast System for co-operation which has enabled us to get our early tests in strategic climatic locations.

I think an analysis of the problem and a tracing of the steps to solution would be of general interest.

Three factors are outstanding:

First, a satisfactory size.

Second, durability.

Third, permanence of color.

Their importance is in the order named, for if you cannot size your decorations properly you are beaten before you start.

To make a proper size required the development of a special type of varnish known as—De Cal size. This material is entirely practical, except that you cannot size-in and letter as large an area at one time as is the general practice on railroad cars. In other words, the size is about twice as fast as ordinary sizing, and it is necessary to apply the decorations in about half the time that would ordinarily be allowed.

The second factor of durability is obviously of next importance.

You remark on pencil varnishing in your editorial, as the present means of protection. Pencil varnishing is usually done with a camel's hair brush, which means the application of a very thin protecting film. If the varnish is an elastic and durable one, much time is sacrificed in drying in order to put on a film thickness of varnish suitable for proper protection of the valuable gold.

The material which we have designed for this purpose is of lacquer type and is known to the vehicle trade as a "clear body finishing lacquer." It is applied with a spray, and this assures

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SINCE 1890 we have made only superior quality lacquers, because inferior quality is always disappointing, no matter how cheap it may be.

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both a heavy protecting film and drying time comparable with that of the lacquer beneath it.

The third factor of color, while important, is not vital, although it would be particularly desirable where gold bronze is used, in place of gold leaf.

We have mastered these first two factors to commercial satisfaction, and they are proving very worthy on a great deal of rolling equipment and outside signs. We believe we are on the threshold of mastering the third factor, although we are not yet satisfied to release this product officially for sale.

Clear Body Finishing Lacquer

The present product— the clear body finishing lacquer—changes color on aging in a manner comparable to varnish. The unofficial product which we have just mentioned has been unchanged in color even after the most severe ultra-violet light exposures.

Preliminary observations indicate that it will not be as durable as the present material, although that is yet to be checked up. Even at that, its durability indicates at least a favorable comparison with finishing varnish, and there is no doubt that it will have a rather wide demand, due to its permanence of color.

It is still a common impression that a clear lacquer will not stand outside exposure. This is because the average layman regards lacquer and nitrocellulose as synonymous terms. The term lacquer means a material which dries to a hard film quickly. It has no reference whatsoever to its composition. It is true that nitrocellulose base lacquer will not stand outside exposure, because the ultra-violet rays of sunlight decompose it quickly.

The reason that colored pigmented nitrocellulose lacquers do not decompose is because the pigments acts as a baffle to the ultra-violet rays. Pigments of ultramarine blue and certain maroon types do not baffle effectively and permit a partial admission of these destructive rays, and that is the reason such colored lacquers are not entirely satisfactory.

The clear body finishing lacquer (mentioned three or four paragraphs previously) is not of nitrocellulose base, and instead of being stimulated to a chemically destructive action by the ultra-violet rays, as is the case with clear lacquers and clear varnish, an apparently friendly relation exists.

Laboratory Tests

The laboratory of one of the largest raw material suppliers in the industry has just completed an exhaustive test, measuring ultra-violet light effects on quartz plates coated with this product. Without going into detail, the findings indicated that these rays apparently dissipate their energy in the form of mild heat when entering this particular type of lacquer film, instead of stimulating a specific chemical action of destruction.

Practical proof of this friendliness to the ultra-violet rays has been demonstrated in many ways, but probably most strikingly with fugitive maroon colored Lacquers. Coatings of such lacquers have been left partly exposed; and partly protected with a coat of this clear body finishing lacquer. In such cases the ultra-violet rays have quickly altered the appearance of the unprotected maroon, and generally retained the original color where protected.

Tests of this character, easily recognized by the layman, are more conclusive than the ones which appeal more strongly to the scientific specialist. This lacquer in the clear form is now giving outside service on the natural wood wheels of several automobile companies; is applied on a number of railroad cars and airplanes; and on thousands of automobile, truck and bus bodies with uniform satisfaction.

In addition to solving the problem of the protection of gold, it also fills the equally important function of being a lacquer base which will wear on wood outside, and a clear lacquer which will not break down under the ultra-violet rays of sunlight as nitrocellulose base lacquers will do.

Orange-Peel in Lacquer Finishes

One of the common troubles encountered in spray application of lacquer materials is the orange-peel surface effect of the sprayed material. This condition is sometimes called pebbling, pitting or pock-marking. The term "pitting," in this connection, is a misnomer in that true film-pitting is generally referred to as a condition usually arising from the presence of water or oil in the material, and is incidental to the non-formation of a true film of the material.

Orange-peel effect usually results from the following:

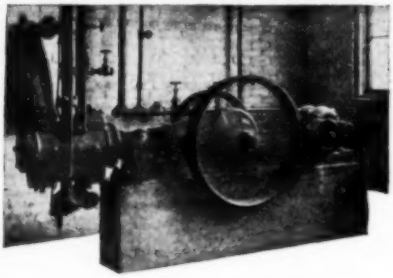
Improper application of the finishing material. The air pressure might either be too high or too low in view of the recommended spraying pressure of the product. It is a known fact that in order to call a product a nitrocellulose lacquer, it must comprise cotton, gum, solvents and non-solvents and plasticizer.

Of the many lacquers manufactured, there are no two concern's products that are identical in structure. With respect to the manufacturer of lacquer products and the above statement, it is reasonable to assume that the thinner of one manufacturer is not going to be suitable in combination with the lacquer and thinners of another manufacturer.

This is explained by the fact that the thinner recommended, and the thinners entering into the make-up of the lacquer product of a certain manufacturer, are in all respects one and the same. The writer finds that the use of unsuitable thinners has caused considerable trouble by resulting in orange-peeling surfaces on lacquer finishes. The common reason for the use of thinners foreign to the type of thinners that enter into the make-up a lacquer, is mostly due to the user buying his thinner on a price basis.

A high air pressure on the gun might cause orange-peel effect. Due to the volatility of the thinner combination, a rapid evaporation takes place and this, incidental to the high air pressure which evaporates the volatile thinners, causes trouble. This condition can best be controlled by regulating the pressure on the gun.

Another cause of orange-peel might lie in the distance that the gun is held from the surface being coated. If the gun is held too close to the work, the material will not atomize properly; if the gun is held too far from the work, the thinners will evaporate and a film of spray dust might be deposited on the work.—J. C. Alsee.



Last installment of a two-part article which explains, in considerable detail, the actual conditions and various elements entering into practical compression, heating, cooling and straining of air to obtain a "commercially pure" product suitable for high grade spray finishing

Compressed Air for Spray Finishing - II

By R. B. Prentice

A DIAGRAM of a compressed-air system, in which the elements are shown that affect the quality of the air delivered at the spray booth, appears in Fig. 3. While this diagram is intended to be suggestive of the arrangement and form of the units composing the system, there are a number of departures from the specific apparatus shown that would enhance its efficiency. However, when a reader becomes familiar with the forces at work in a compressed air system, his own judgment will carry him far and indicate practical means for harnessing up compressed air in a wide variety of apparatus, all of which may be equally efficient.

Intake Air Strainer

The reference numeral *1* indicates the usual air strainer located at the inlet to the system, outside of the building; number *2* is the intake pipe; number *3* is a separator made up of a piece of large-diameter pipe partially filled with clean sharp gravel and provided with couplings welded thereto to afford places for connection of the intake pipe and the drain pipe with cock marked *4*. Numeral *5* indicates the exhaust pipe through which the pulsating air stream flows into the condenser coil *6*. This condenser coil *6* is immersed in a cold water bath inclosed in the tank *7*.

Following Flow of Air

From the condenser *6* the air flows into the separator *8*, which is similar in construction to the separator *3*—with the exception that the pipe connections are a little differently located and a fourth connection is provided for communication to the gauge pipe *9* to which are connected the pressure gauge *10*, safety valve *11*, and the unloader *12*.

The riser *13*, of liberal size, conducts the air upward to the highest point in the system and communicates immediately at its upper end with the third separator *14*. From this separator the service pipe *15*—installed with

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great care so as to provide a constant drainage in the direction indicated by the arrow—distributes the air to the various drop pipes such as *16*, pressure reducers *17*, oil and water separators *18*, and gun hoses *19*. It will be observed that the pressure reducer *17* precedes the oil and water separator *18*.

The intake separator *3* is in no wise essential and may be well argued against by compressor manufacturers, whose contention that such an interference with the free flow of air into the compressor affects the volumetric efficiency thereof to such an extent as to make the use of a separator at this point bad practice. Yet, under certain conditions, such a separator may actually help the volumetric efficiency of the compressor, and certainly, in parts of the country where humidities are very high during some seasons of the year, its advantages are obvious.

Air Strainer Design

Therefore, to overcome the argument of the compressor manufacturer and make this separator practical and economical, the following factors must be taken into consideration: The separator *3* must be very large, and fine, clean, sharp gravel must be used. The length of pipe between the compressor and the separator must be the shortest possible to use. Then, in cases where the intake pipe from the separator to the strainer must be very long, the volumetric capacity of the separator will serve to boost the intake of the compressor over what would be possible with a straight length of pipe without such a separator. In wet weather, the intake separator will catch a good deal of water, but in dry weather perhaps none at all.

On the exhaust side of the compressor, the elements shown are scarcely open to criticism. We have noted how temperature increases the capacity of the air for water, despite compression. Now, if this compressed air be cooled immediately after compression in the condenser coil *6* down to or below its initial temperature, both the compression and the tempera-

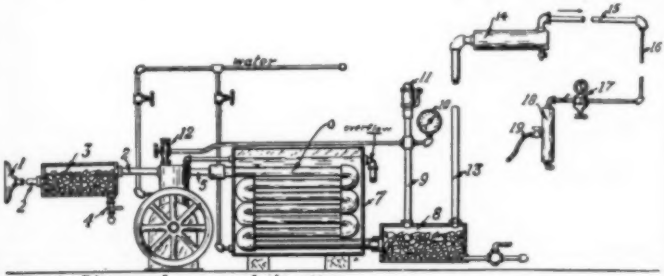


Fig. 3—Diagram of compressed air system.

1 Air strainer outside building.
2 Air intake pipe.
3 Air filter or separator.
4 Drain cock.
5 Exhaust pipe.
6 Condenser coil.
7 Tank inclosing condenser coil.
8 Air filter or separator.
9 Gauge pipe.
10 Pressure gauge.
11 Safety valve.
12 Unloader.
13 Riser pipe.
14 Air filter or separator.
15 Service pipe.
16 Drop pipe. (one of several)
17 Pressure reducer.
18 Water separator.
19 Hose to gun. (one of several)

ture will co-operate to precipitate the oil and water out of the air at once, and this moisture will be effectively trapped by the separator *8*.

Pressure; Temperature

Any flow of air through pipes implies a reduction of pressure and consequently a reduction of temperature. This drop in pressure—and temperature—is of the greatest magnitude in the riser *13*, where gravity affects the density of the air at the varying altitudes; hence the separator *14* will be effectual.

The service pipe should be large enough, ordinarily about 1-in., to provide for a relatively low velocity of the air so that it may have time to regain such temperature, as is lost in the flow and consequent drop in pressure, from the surrounding atmosphere. The warmest part of a room is near the ceiling and for this reason service pipes should be overhead rather than near the floor.

If a 6-ft. length of drop piping *(16)* be steam jacketed, a gain in volume of air of about 20 percent will be effected and dry air will be doubly insured at the gun.

It must be remembered when separators are made that the gravel must be carefully screened and the outlets must be covered with brass screening of a mesh that will positively prevent any gravel getting into the system. It is not likely that the gravel would be lifted into the pipes, but on account of the disastrous effects of gravel in the wrong place, especially in the compressor, this is a precaution of prime importance.

The Condenser Coil

As an example of a variation that will prove efficient, the condenser coil *6* can be made of gradually decreasing pipe sizes, and the lineal footage greatly increased; the cooling effect will be materially increased on account of the greater amount of surface presented by the smaller pipe. But 10 or 12 ft. or even more, of the larger pipe—larger than the compressor outlet—should be used to prevent the possibility of choking the compressor.

Elkhart Enamel Co. Reorganized

The Elkhart Enamel and Paint Corp., has been taken over by a group of Indianapolis paint men, headed by W. H. Gerke, President of the Sargent-Gerke Co., who will be the new president of the Elkhart Co.

The Elkhart Enamel and Paint Corp. is a well established concern doing strictly an industrial business among the woodworking and metal trades.

Stock control of the corporation has passed from a group of Elkhart business men. The transaction includes also the real estate and buildings owned by Mr. James A. Bell of Elkhart. The plant consists of two buildings; one 60x250-ft., another 50x125-ft., two stories, with approximately an acre of ground available for further expansion.

Other members of the firm are: Mr. C. C. Griffith, Mr. W. O. Hose, and Mr. F. C. Soehner, all of whom will become officials of the reorganized corporation.

Hornac—New Outside Paint

The Art Craft Division of A. C. Horn Co., 101 Park Ave., New York City, is sending out a 10-page booklet which supplies information about a new outside paint called, "Hornac" which, according to a statement in the book, "absorbs the ultra-violet rays which are thrown at the paint, neutralizes them by converting them into heat, and prevents them from doing further damage to the vehicle. The result is that Hornac keeps much of its original luster long after dulling would ordinarily have taken place; at the same time, Hornac's durability establishes an entirely new conception of the life of outside paint."

Furniture Finishes at Grand Rapids Show

What finishes and color decorations were new or outstanding on certain pieces and suites at the Mid-summer market in Grand Rapids

By J. C. Hertstein, Jr.

THE GRAND RAPIDS Mid-summer exhibition brought forth furniture new in design, but few radical changes in the finishes were in evidence.

In the novelty furniture line consisting of magazine baskets, smoking stands, end tables, etc., the ever popular Chinese reds, and the green-and-blacks were good sellers. Most of these novelties were hand decorated. In some cases where price was a factor, the manufacturers used decalcomania transfers instead of hand decorations.

A few of the novelties were finished in the natural wood, with colored decorations to give them added life. No new finishes were shown but some manufacturers were showing different decorative color schemes and had new combinations.

Reed and Fiber Furniture

The showing of reed and fiber furniture was again very attractive, the manufacturers having more than 50 color schemes from which buyers could choose. Outstanding among these was a suite finished in apricot shellac and trimmed with a light blue. This combination was somewhat similar to tan and blue, only slightly more attractive.

Another reed suite which was taking well was one finished in antique ivory, the back framework being shaded with blue, while the posts and feet were shaded with blue and gold stripes.

The line of infants' beds attracted attention this year. Particularly attractive was a bed and chifforobe finished in tan and shaded with green, the decorations on the front and back being decalcomania transfers or medallions.

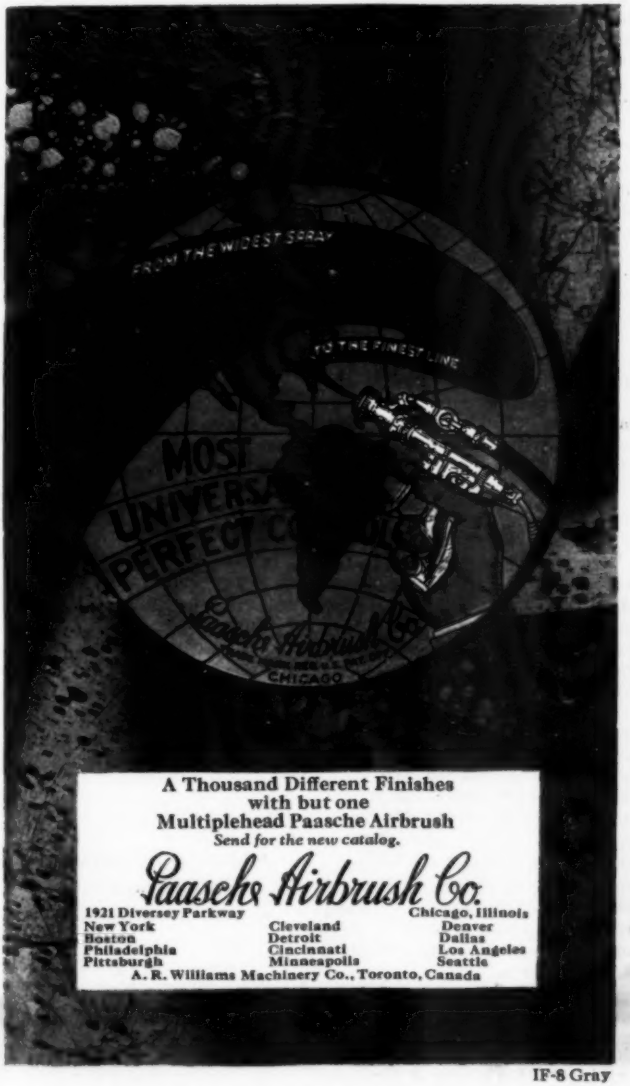
Bedroom and Dining Room

The regular lines of bedroom and dining room furniture, that is the commercial lines, were finished for the most part in the pyroxylin lacquer finish. Many of these pieces seemed to have good depth to their finish. Evidently many manufacturers of this class of furniture are realizing the advantage of finishing bedroom furniture with a final coat of flat lacquer or varnish, as there were quite a few suites finished in this manner.

Much of the traditional furniture is still being finished in varnish, several coats being applied and rubbed before the desired finish is obtained. This can be done on the high-priced furniture but, of course, would not be possible with the cheaper competitive lines.

Breakfast Room

That color is not being discarded is certainly proved this year by the many lines of breakfast-room furniture shown. No radical changes were noted. Different combinations were used



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but, for the most part, the standard shades used during the past two years are still leading sellers.

Lacquer enamels too have proved to be the popular finish with many prominent breakfast-room manufacturers, because for one thing, it enables them to obtain a wider range of colors. Then too, the advantage of having a durable finish which will stand a great deal of abuse is a prime factor in the use of this material.

There is evidently a large market for day beds, judging by the splendid showing this year. One of the attractive patterns shown was in the "Moderne style" and was finished in black lacquer enamel with white stripings and decorative plaques.

New Style Office Desk

Diverging somewhat from the old stereotyped straight lines in office desks, one large manufacturer has brought out a new type of desk in the period design; it is getting much attention at this market.

Made up with beautifully matched drawer fronts and old-gold hardware, the desk is a remarkable contrast to the rigid lines of the old style. It can be obtained with turned or hand-sawed legs. This piece of furniture has a beautifully polished top or surface showing the excellent grain of the wood. Probably five or six coats of varnish were applied to get this splendid finish on the surface.

Note by Author: The illustration at the top of this page shows two interesting pieces of furniture

on exhibit at the Grand Rapids Mid-summer Furniture Market. Both pieces are products of Johnson-Handley-Johnson Co., Grand Rapids, Mich.

This card table has been designed after the new Art Moderne type of furniture. In each of the four corners, there is a small swinging drawer which contains an ash tray, matches and cigar holder. On two sides there is a large center drawer. Each leg is so constructed that it has two shelves on which cards, cigarettes, glasses, etc., can be placed.

The table is of mahogany construction, while the top is covered with snake-grain Art Moderne leather. The seat and back of the chair are also covered with this style of leather. The chairs are made to match the table in design and finish.

Additional Comments on Grand Rapids Show

In the cycle of change in furniture style and finish, we have become accustomed to adaptation rather than innovation. As an example of the former, we have had, since the war, polychrome with the revival of Italian Renaissance, Spanish with the re-

The Glory of Oak

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These finishes are just being announced to the Furniture Trade, and are the result of the efforts of Marietta Artists.

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vival of Spanish Renaissance, and all the finish changes which human ingenuity could ring on walnut—French, two-tone, shaded, and what not. Each had its day and passed—the good to be cherished, the bad to be consigned to oblivion.

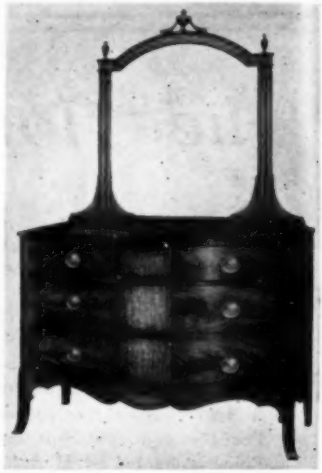
Moderne

What shall we say then in the face of a brand new design, a radical departure from anything that has been seen as far back as the Pharaohs, where furniture is the first the human race knows of; in other words, an adaptation of nothing heretofore created, but born of and inspired by our very own age. Twentieth century to the core, Moderne is the very flesh and blood of our own times, the artistic expression of stepped up sky-scrapers, airplanes, gigantic locks and dams, subways, machinery, telephone, telegraph, radio—everthing in short that spells modern American civilization.

Like it or not, it is here and it had to be born. We should have been the creators, but we may only claim the credit of unconscious inspiration, for a German was the originator, and French, Italian, Belgian, and Swedish designers and decorators seized upon it long before we. Only now has our child come home to us and it is for the future to say whether Moderne shall be welcomed in the home of its nativity, or passed over for another in the long series of old world period variations.

Moderne at Grand Rapids

The French adaptations of the original German are products of studies and are rather too startling in price and color scheme to suit the average American home. It, therefore, remains for us to take what we can of it and give it that restraint and "livability" of form and detail that will make for popular appeal in these United States. This, Grand Rapids has largely done.



Photograph, courtesy of John Widdicomb Co., Grand Rapids, Mich.

Design; Veneer; Finish

In design we see principally straight lines, sharp angles and unbroken curves; in veneer woods, satinwood, Bubinga, cherry burl, pencil-stripe walnut, Carpathian elm, Australian walnut, rosewood, tulip wood, ebony, zebra wood and curly maple. In finish the very simplest natural treatment prevails on the bulk of the pieces—light yellows, browns, reds, and grays—set off by contrasting darkness sparingly used in trim woods.

Lacquer is chosen for its paleness as a finishing coat, and is rubbed dull or polished to a high luster. Hardware is of silver or ivory and is of the most austere

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design. In painted work, black and silver (aluminum or leaf), black and vermilion, green and silver, gray and black or silver, royal blue and gray or silver predominate.

Natural and Painted Moderne

Most of the natural finishes are executed in bedroom lines, considerable in living room and allied small pieces, and a few for the dining room. Paint shares honors with rare veneers in the living room field and is exclusively used in reed furniture, where the aid of striking fabric designs in contrasting colors has given some beautiful effects. In upholstered pieces, the wood finish plays only a small part, being confined to fluted legs and squat ball feet—reddish brown mahogany on the former and dark walnut on the latter.

To sum up, the natural Moderne finish is essentially light in tone, clean in appearance, decorative through its emphasis on the natural wood figure, striking in its simplicity of contour, restful in its freedom from fussy ornamentation, and practical because of its solidity and smoothness of surface. The painted finish is less restrained and is, undoubtedly, intended to act as a color counterbalance in the general scheme. Both require a background in wall finish, rugs and draperies, which will be complementary.

By way of individual example, we may cite a bedroom suite with giborna tops, satinwood fronts in diagonal cutting, rosewood dividers, and ivory drop pulls. Another shows cherry burl tops, bleached striped-walnut fronts, rosewood, zebra wood, and ebony trim woods. A dining room suite stands out with satinwood top, snake wood inlay, pale walnut legs, and cherry burl bands.

Other Designs and Finishes

The bulk of furniture shown at Grand Rapids naturally remains true to the conventional forms, principally blends of Queen Anne, Louis XVI, and Adam. Queen Anne shows increased carving. Colonial is rendered richer with crotch mahogany veneers, and Gothic oak is severely antiqued. Some Spanish survives, with panels and dark walnut heavily shaded in recesses.

Walnut continues to dominate, but with less shading, which seems to be confined more to legs and is less conspicuous than ever on tops, fronts, and sides. The tone is lighter, richer, and more of a reddish cast is in evidence, with faintly contrasting tones of light and dark, sometimes with, but more often without vein-line dividers. Less polish, too, was noted than six months ago.

In the higher-priced lines, carvings appear more abundant and with greater attention to detail. Marquetry and fancy inlay woods too have gained wider use as against oriental flat and raised painted decorations which appear to have run their course. In the lower-priced suites, plainer lines are observable with straight fluted or cabriole legs, as against heavy bulbous turnings and large ball feet.

Mahogany, Satinwood, Oak, Maple

Every exhibit, while predominantly walnut, shows two or more mahogany suites in pleasing variety of novel figures, frequently in a highly polished one-tone finish. One satinwood suite is also included, less sharp in tone than heretofore, and with a dull, shaded finish. Marquetry or dark hand-painted medallions usually constitute the decoration.

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Oak of strong Gothic inspiration, too, is freely shown with liberally-dusted linen-fold and other typical carvings, dead flat in luster, and dark in tone and shading. One oak bedroom suite is two-tone, the lighter part being almost a matte golden shade, but most of the oak appears in the dining room lines. Maple is favored in the curly figure as against birdseye, all delicately shaded in warm brown against a grayish amber or light tan background. It is no longer striped or decorated in solid colors and has become staple in colonial designs.

Bedroom suites in enamel are rarely seen, and dining room suites and even dinettes practically never. Enamel in bedroom lines shows narrow limits of color range, gray green and ivory, fawn gray and tan, cafe au lait and olive green. Two-toning prevails with decorations of arabesques and shading in great restraint. Stippled overlays, floral groups, carvings, and vein lining have passed out of the picture.

Fancy Veneers

There is a noticeable increase in the use of imported trim woods. Observable in profusion is butt and burl walnut, crotch mahogany and walnut, but in conjunction with them, lightly stained and often finished natural, are pencil-stripe walnut, Carpathian elm, mahogany in unusual cuttings, satinwood, rosewood, and zebra wood. Practically none is shaded; straight colors in light tones are the rule. As against previous markets, little is seen of ash, lacewood, harewood, or sycamore.

Reed furniture shows pronounced Moderne influence. Lines are straighter, forms are more squat, colors in the frame are more neutral, leaving the striking effects to the patterns of the upholstery fabrics. Singleness of color in the frame with shading at the joints has superseded a variety of bright colors. Moderne has also strongly affected the upholstered lines, which are also built lower, show less frame, and darker tones in the finish.—R. G. Meade.

The love and effectiveness of color is as old as the world itself. That is why everything colorful is interesting and appealing.

A Berry Bros. Manager Flies

Thomas E. Colby, manager of the Aviation Department for Berry Bros., Inc. of Detroit, and his assistant are in the National Air Tour. Mr. Colby's ship won the "Class B" race from New York to Seattle last year. Mr. Colby calls on the aviation industrial finishing trade by airplane.

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EDITORIAL

Current Business Conditions

The first half of 1928 closed with business activity maintained on a singularly even level. In so far as the prospects of the second half of the year can now be judged, a continuation of this middle-ground sort of prosperity seems probable. The period should be better than the latter half of 1927, which was a period of declining volume, though it is not likely to equal the records established in some more active years.

A large and well diversified list of industries has enjoyed very good business in this last six months, while the number of lines in which demand has been really poor is small. In nearly all industries, operations have been soundly based; they have reflected an actually existing volume of requirements rather than the accumulation of stocks in anticipation of hoped-for gains. In fact the tendency both in producing and distributive enterprises has been very markedly that of keeping operations in the closest possible harmony with consuming needs.

This attitude of caution, apparent throughout the business world, is one of the most significant features of the current position. A record volume of construction work and steel output, the strength of the copper market, the high level of activity in the automotive, agricultural-implement, machine tool, chemical, electrical and many other branches of industry—all these have not seemed sufficiently impressive to give a buoyantly optimistic tone to business.—Commerce Monthly.

Increase Sales Abroad

The volume of the exports of the United States during the past three years averaged about four billions, 700 millions of dollars of which 43 percent went to English-speaking countries; 17 percent to Teutonic and Slavic speaking; and 30 percent to Spanish, French, Italian and Portuguese speaking countries.

This brings out the importance of translating certain of our standards into these foreign languages, wherever the commodity has a foreign market. Several foreign countries, whose volume of exports reach important figures, have distributed translations of their national standards abroad.

The British have done some notable work along this line, expending, according to a statement of an official of the British Engineering Standards Association, more than 20,000 pounds Sterling for publication in Spanish, French,

Italian and Portuguese languages and for the strategic spreading of these in overseas countries.

Obviously, the sponsorship for translating, publishing and distributing of American standards can be done more efficiently by one central agency than by a number of individual agencies. A group of industries and organizations has indicated that the work could be effectively carried out under the auspices of the Department of Commerce, which now maintains a field staff for promotion of commerce abroad.

More Simplification in Industry

Continued growth of Simplified Practice as a means of eliminating waste in industry is evidenced by the completion during the calendar year 1927, of 18 new Simplified Practice Recommendations, thus bringing the total projects completed to 80, according to a review of the past year's activities of the Commercial Standards Group, Bureau of Standards, by Ray M. Hudson, Assistant Director, in charge.

That simplification yields benefits sufficient to attract manufacturers, distributors and consumers alike, is demonstrated in the high degree of adherence shown by recent reviews of 15 of Simplified Practice Recommendations already promulgated. The report shows that acceptors representing an average of 82½ percent of the total volume of the industry effected are following the simplified practice schedules.

These recommendations are subject to annual reconsideration to determine the desirability of further eliminations, substitutions or reinstatements. This procedure keeps the Simplified Practice Recommendations up-to-date and in line with the best current practice of the industry concerned.

Further evidence that simplification is proving of great value to manufacturers and purchasers is found in the increased number of associations accepting the completed recommendations. The list of associational endorsers grew from 686 to 898 during the year, the individual concerns, from 2,775 to 6,676. This means an increasing number of industrial purchasers are specifying simplified lines when buying, because they are finding that such items are usually more readily obtained; that their quality is better; and, in many instances, by reason of the savings wrought through simplification, prices are lower.

It must be remembered that savings from adoption of the simplified lines are obtained by the small manufacturers as well as the large, and also by the public. A survey of the benefits to acceptors from simplified practice recommendations shows many cases of definite money savings, by the small manufacturers as well as the large.

Fire Hazard Posters for Finishing Rooms

Since everyone in industry is, or should be, interested in doing everything that is reasonably pos-

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sible to avoid the starting of a fire in paint shops and finishing rooms, we are taking the liberty of reproducing herewith a list of precautions compiled with the idea of practically eliminating fire hazards in industrial finishing rooms. The precautions are printed in poster form for distribution to aircraft factories (hence the reference to dope) but they are equally applicable to other industries that use finishing materials. The information is given as follows:

"Fire hazards in aircraft factories can be practically eliminated by observing the following precautions:

1—Use "good-housekeeping" methods throughout the entire plant.

(a) Spontaneous combustion will occur in piles of dirty or oily rags. Remember that many fires start this way, as well as from paint materials.

(b) Dirt and spray dust on the floors, on spraying equipment or in spray booths, are sources of danger. Keep your equipment clean at all times.

(c) Do not allow an excess of paint, dope or lacquer to accumulate in any form (dry, dust or semi-dry) in or near the finishing department.

2—Proper ventilation is necessary both in spray booths and dope rooms.

(a) An exhaust fan of sufficient size should be installed in each spray booth to produce an air velocity of 100 linear feet per minute. Non-sparking equipment should be used.

(b) The fresh air supply should be distributed to avoid back drafts from exhaust chambers.

(c) Keep windows closed near spray booths and admit air through designated openings, generally along the ceiling.

(d) Reputable manufacturers of spraying equipment should be consulted on this important subject.

3—Spraying work outside of properly designed spray booths constitutes a serious hazard with all types of finishing materials. Immediate exhaustion of fumes from spraying or doping operations eliminates one of the greatest hazards of dope or lacquer.

4—All painting and doping materials, not in actual use, should be stored well outside of the finishing building.

5—No smoking should be permitted in aircraft factories, nor should open flames be allowed near the finishing rooms.

6—Fire-fighting equipment should be readily available.

(a) An overhead sprinkling system will pay for itself in a few years on savings in fire insurance.

(b) Fire extinguishers of the Foamite type are recommended for the paint department.

7—"Ground" the mechanical equipment in the paint shop to prevent sparks of static electricity.

8—Concrete floors in finishing rooms are not recommended because of possible "sparking" caused by nails in workers' shoes. Composition flooring or rubber soles on workers' shoes, will eliminate this danger.

9—When possible, separate the dope and paint rooms from the rest of the factory, preferably in another building."

The 10¼x16-in. printed posters are being sent out by Berry Brothers, Inc., Detroit, Michigan.

Devoted to—
Questions
Answers
Suggestions
Comments and
Discussions on
Specific Problems

Questions and Answers

Information Service

Every issue of *Industrial Finishing* contains a wealth of practical information on various subjects of interest to users of finishes and finishing equipment, but from time to time new problems and questions arise, which demand prompt and authentic information. *Industrial Finishing* is in position to service inquiries, and the editor invites all individuals and concerns in the industry to make known their wants. Every effort will be made to supply the information desired, at no cost to you.

Questions are invited in regard to:

Finishing-room troubles or problems;
Where to obtain certain materials, supplies or equipment;
What methods or materials to use for certain results.

Additional comments or suggestions regarding questions, answers or articles appearing in this section, are invited.

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Flat Wood Lacquer No. 5

A Flat Lacquer Which BUILDS UP A Soft Velvety Sheen

When sprayed over clear Mawalac it builds up a film having DEPTH of FINISH and yet retains its transparency.

It brings out the full beauty of the wood into a Soft Velvety Finish similar to Rubbed Clear Lacquer.

Does not mar easily or become greasy when handled. It is particularly ideal on carved wood parts which are difficult to rub.

Please write us to have our representative call on you.

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R. C. Flanigan, Southern Representative
P. O. Box 222, High Point, N. C.

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

What Lubricant for Oven Conveyor Bearings

I am writing in regards to what kind of lubrication to use in a japanning oven, that will withstand heat and give best results.

The ovens referred to are the long conveyor type using a standard roller bearing which is on the inside being exposed to the heat. The oven is held from 375 to 425-deg. F.

We are at present using a heavy Artic cup grease for lubrication, the bearings being greased from the outside by a grease gun. But we are having a great deal of trouble with this grease drying or burning in the bearings and leaving a sediment which in time fills the bearing tight and sticks it. Some of this sediment may be from the fumes of the baking varnish.

I would greatly appreciate any information you could give me in regard to any lubrication on the market that would be satisfactory for this purpose and which would withstand the heat—D. B.

I am of the opinion that cup grease can be obtained which will not melt and run at 425-deg. F., although I am not positive of this. I wonder if a graphite lubricating compound of some sort could not be used to advantage for lubricating the conveyor equipment in ovens such as this? If you will put your problem up to a competent oil company, no doubt the oil company will be able to furnish a satisfactory lubricant for this special condition. Also, undoubtedly oven manufacturers already have a definite answer for questions such as this.—W. H. Martindale.

Stipple Finishing Metal Novelties

We are very anxious to secure all the information possible on stipple paste, that is, securing the stipple effect on metal novelties. Would appreciate any information you can give us along this line and also the names of the concerns who make a specialty of this product. We are especially interested in the method of applying this and getting the effect through spray guns. We are equipped with extra large nozzles and pressure tanks. Also, we would like to know the best method of applying this by hand.—A. N. Co.

You will find that any one of the plastic paints manufactured today will do the work you desire. There are various types of this material —both dry and mixed in oil. The dry material is simply mixed in cold water to arrive at the desired consistency, according to the texture desired.

I don't know of any specially

made paste, but you can make your own by taking outside white oil paint and adding whiting until you form a plaster. Then add rubbing varnish and japan drier, and thin with turpentine or benzine.

Of course, it will depend on how heavy you want the stipple, whether or not you can use the spray gun on this work. You will need to do some experimenting to find out the most suitable method for your needs and what material is best suited to the price of the article to be manufactured.

You may be able to apply the stipple past with your air brush, and stipple by giving the trigger on the gun a quick jerking motion or, after applying material with the gun, stipple by hand with a stubby brush according to the size of the article. The plastic coating needs to be from $\frac{1}{32}$ to $\frac{1}{16}$-in. thick. This is where the beauty of finish comes in this class of work. The thicker the texture, the better the finished article will look.

Different kinds of stipple may be made by using a wad of paper, or a circular scroll can be produced by using the tips of the fingers, drawing them through the plastic in a circular motion. A pen holder or round stick may also be used for this purpose. If the hand method is used, all that is necessary is the small brush.

According to the article, brush on the thickness wanted and stipple. It is advisable to use a drying system, as all of these plastics are slow drying, depending on the room temperature. To get large production, however, forced drying is necessary—six hours being the drying time required for this material.

After the plastic is dry, give the article a coat of shellac or lacquer to serve as a sizing. The shellac may be colored, this serving as a ground for your glazing or antique colors.

If gold or silver ground is used, the finisher must shellac or lacquer before applying antique colors, in order to keep the color from going into the gold. Some of the colors that go well with gold bronze are orange brown, chrome green, emerald green, silver blue, green magenta and blue, lavender and many others.

Articles may be painted with colors as a ground or glazed in color in harmony with the ground color. Glazing colors may be made of flat varnish, japan or oil colors, or with turpentine and oil driers, but the flat varnish glaze will be the most suitable, as after the wiping process nothing more is needed to finish the article. This surface can then be sprayed and wiped by hand. This mixture drys very fast and needs fast wiping. The wiping is done with a cloth, which removes all the material

Made *free* from gum
Auto Lacquers
Of Dependable, Superior Quality
We have been manufacturing for 70 years at Newark, N. J.
Chas. Cooper & Co.
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RAUX ESTER GUM RESINS
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Gums cut, fused or treated to meet individual requirements.
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Armitage Armorlac

There are a number of very good reasons why Armitage Armorlac is gaining greater favor every day. Here are the chief reasons:

1 It is a Lacquer finish of utmost dependability.

2 It adapts itself to an unusually wide range of surfaces.

3 A beautiful, durable finish is always produced, whether Armorlac be applied over Metal, Wood, Reed or Composition. All surfaces are alike to Armorlac.

4 Armorlac is unusually adhesive.

5 Armorlac is made in either gloss or eggshell finish.

John L. Armitage & Co.

Newark, N. J.

Makers of Varnishes and Lacquers.

from the high-lights, leaving the color in the pits and holes in the texture.—J. K. Cooper.

Restoring Marred Finishes

Referring to the Hotel Head Painter's question on page 69 of July issue, it has been my experience that the use of alcohol or lacquer thinner is the best for taking out white or gray spots on finished surfaces. But it is almost impossible to get a woman to learn how to handle that.

Clean the surface with one part benzene mixed with two parts of crude oil. Shake well before using. Then rub the spot with clear olive oil. This might fix it.

I also suggest giving the tops of tables and dressers a coat of good spar varnish, and I believe you would not have to worry about any more spots from water or ginger ale and perhaps from some kinds of liquor too.—Martin C. Nordvall.

Sealer Over Varnish and Under Lacquer

Do you know of any material that we can spray over old varnish or any varnish finish so that it will not "lift," and so that we can finish right over that, using pyroxlin finishes?—H. & O.

I assume that H. & O. refer to a material to be used over clear finishes and under clear lacquers. If this is the case, I believe white shellac is as good a sealer as can be obtained for use over old varnish to prevent the lacquer from softening up and lifting the old finish. Some of the paint and varnish companies sell a "sealer" for this purpose but, in many cases, this is really a pure refined white shellac.

If the finish in question is a colored one, or if colored lacquers are to be the finishing coats, then I would suggest one of the regular type of paint primers made purposely to resist the solvent action of lacquer to be used over the old finish before the lacquer enamel coats are applied.—C. F. Merrifield.

"Varnolene" as a Thinner

We have for some time been using a Standard Oil product called "Varnolene" as a thinner for oil paints instead of turpentine. Lately, we have been criticized under the supposition that this "Varnolene" is injurious to oil paints. Can you, please, inform us whether this is the case or not?—T. U. M. P. Co.

It is not possible to give a definite "yes" or "no" answer without knowing all about the oil paint in question and all about the particular shipment of "Varnolene" in question.

Varnolene is used by many paint and varnish manufacturers as a thinner for certain types of oil paints in place of turpentine. When mineral spirits or substitute turpentine, such as this material is, are free from heavy-boiling fractions, or greasy fractions, which do not easily evaporate, and when they are free from sulphur

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Have Stood the Test of Time
Nitro-Cellulose Solutions of all Kinds.
Bloomfield Chemical Co.
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The writing on the wall

The demand for lacquers is seriously weakening in some directions because many lacquer manufacturers—desirous of retaining or securing business by price instead of quality competition—have cheapened their product at the expense of quality to a point where it is really unfit for the use for which it is sold.

Demanding a cheap lacquer is a fallacy; cheapening lacquers to the danger point to meet that demand is the present fallacy of the lacquer industry. The wise manufacturer will gladly do without business which requires him to sacrifice a reasonable standard of quality.

* * *

The proper formulation of Pentasol or Pent-acetate in both brushing and spray lacquers will produce a product which will retain quality at a price that can meet any legitimate competition.

The SHARPLES SOLVENTS Corp.
2304 WESTMORELAND STREET, PHILADELPHIA
548 B RAILWAY EXCHANGE BUILDING, CHICAGO
501A FIFTH AVENUE, NEW YORK

or other similar injurious materials, they may give very satisfactory results when used as thinners in the proper proportions for the proper types of oil paints.

Certain enamels and paints, which contain a large percentage of certain types of varnishes, cannot be thinned as safely with mineral turpentine as with pure turpentine, for the reason that the mineral turpentine does not have as strong solvent action on the gums in the varnish proportions of the formula as turpentine does, and if the mineral turpentine is added in too large quantities, or is not added slowly, there is danger of throwing out of solution a portion of these varnish gums, causing the varnish, paint, or enamel to appear dirty or gritty, and oftentimes completely destroying the adhesion and durability of the film.

However, as pointed out in the beginning, this is true only with certain types of varnishes, paints and enamels; other types can be safely reduced to a certain extent with turpentine substitute, provided, as mentioned before, the mineral turpentine is free from grease and sulphur or similar injurious materials.

Of course, it is true that under certain circumstances, mineral turpentine might not be a satisfactory substitute for turpentine where a certain definite range of evaporation of the thinners or setting up of the coating is desired. In other words, mineral turpentine does not have exactly the same distillation range as pure turpentine, although it roughly corresponds to the same range of distillation.

With more definite information as to what paint is in question and as to whether the complaint is about one shipment of mineral turpentine or all shipments of mineral turpentine, I would be able to give a more definite answer to this question.—R. L. Masterson.

Recovering Wasted Spray Lacquer

Referring to the question under this title on page 70 of July issue, and the several replies to it in that same issue, I firmly believe that all lacquer manufacturers would prefer not to have this material re-worked in any way, not only because of the decreased volume of business that would result, but also because of the fact that the re-worked material can never be controlled very satisfactorily as to quality—and it may be the means of spoiling some perfectly good lacquer applied over it.

Furthermore, the hazard attendant to the working up of this material is comparatively great because of the very volatile solvents required to again dissolve the residue, and it would be so much bother to accumulate the residue in a clean and satisfactory manner, that I doubt if the man who attempted to reclaim this material would save any money at all by doing so.

To reclaim material satisfactorily, it would be necessary to have it absolutely free from grease or oil of any nature; otherwise the reclaimed products would not dry satisfactorily.

Many lacquers today contain small quantities of oxidizing oils and of course this portion of the lacquer would be oxidized and retained practically insoluble by being sprayed into a fine mist and allowed to accumulate in the spray booth or exhaust pipes; otherwise, the material could be completely dissolved in lacquer

Invite us to show you

Sun Flat Lacquer

We will display our goods at our expense, and give you practical advice. How best to use.

White No. 1 Lacquer

COLORLESS

Clear and transparent, looks like a coat of celluloid on work. Can be polished.

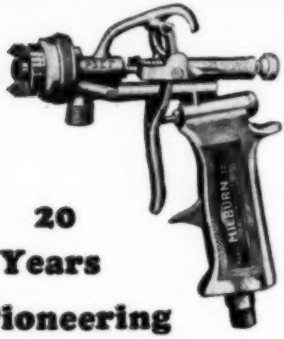
FINISHING ROOM FAVORITES

No. 115 Pale Rubbing

The reliable quality varnish that held its own so many years in the face of keen competition.

SUN VARNISH CO.

Louisville, Ky.



20 Years Pioneering Back of This Spray Gun

Investigate Its Important Features

For 20 years this company has been a pioneer in gas and air equipment and has perfected Milburn Equipment to such an extent that after exhaustive service, tests and comparisons, it has become the standard for some of the world's greatest industries.

Besides its exclusive, patented features which are responsible for its remarkable efficiency and its great economy in operation, the Milburn Paint and Lacquer Spray Gun is the most durable spray gun made. Its frame is of forged tobin bronze with a tensile strength of 50,000 pounds to the square inch!

This sturdy construction makes it practically immune to injury. It makes it impossible to get out of alignment. It keeps it IN SERVICE ALWAYS—DAY IN AND DAY OUT. No time is lost in the finishing room because the spray gun is in need of repairs.

Two Types. Type E, the standard form, and Type EF (illustrated above) with dialed atomizer head and graduated indexed paint needle valve which permit all operations to be calibrated.

Before you add to your spray painting equipment, you owe it to yourself to investigate the FIFTEEN IMPORTANT FEATURES OF THE MILBURN GUN. Write for full details today. Ask for Bulletin 4673.

THE ALEXANDER MILBURN CO.

1416-1428 W. Baltimore St.

Baltimore, Md.

Manufacturers of Complete Spray Painting Equipment for Your Finishing Department

solvents, filtered or strained to remove dust and dirt and used for a coating on inexpensive objects—provided it could be collected economically.

Some people make a practice of collecting and reclaiming shellac dust from spray booths and I understand that one shellac company buys this collection from one or two of its largest customers, but personally, I believe this is done more to insure their customers remaining with them than for the reason that they really get much value out of the waste shellac dust.

In the varnish days, a few large users of varnish made it a practice of accumulating their waste material and either selling it to their original source of supply or having it re-worked up into a varnish for the backs of their furniture. Frankly the cost of reworking material such as this is greater than any materials of a similar quality could be sold for. Personally, I do not like to see anything done that would tend to promote the practice of trying to salvage the accumulated materials in spray booths, as it will mean a great deal of trouble to all finishing material manufacturers and it will be a step in the direction of lowering the quality of finishes rather than bettering the quality of those finishes.—F. C. Overhauser.

Color Furniture In The Home

The Heywood-Wakefield Co., Boston, Mass., manufacturer of a large and varied line of furniture is sending out free a new 36-page booklet entitled, "Color Furniture In The Home," which reveals interesting information about new color schemes and furniture arrangement for the modern home. Several pages are also devoted to describing how reed and fiber furniture are made.

DOLAN'S
Products of
"Unquestionable Quality"
#3 Gloss Lacquer
—exceptionally tough
—dries very hard
—3 coats may be applied in one day
—no harder to rub than ordinary lacquer
#4 Flat Lacquer
—produces a satin finish
—flows smoothly
—imitates a rubbed effect perfectly
We also manufacture a Lacquer Remover of exceptional merit—and our Lacquer Shading Stains and Fillers cannot be surpassed.
Samples of any of above products are yours for the asking
V. J. DOLAN & CO.
1832 N. Laramie Ave. Chicago, Ill.

TUMBLING LACQUERS *perfected* for the first time

DAY'S Tumbling Lacquers, in clear, opaque or transparent colored finishes give a result equal to that obtained by spray or dip—at half the labor cost. We'll be glad to tumble a peck of your turnings free to show the fine result you yourself can obtain. You will like the result and the reduced cost.

JAMES B. DAY & CO., CHICAGO

New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

New Grounding Wire Connection Clamp

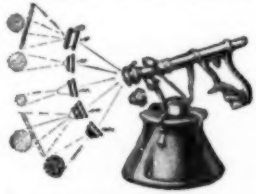
The Copperweld Steel Co., of Glassport, Pa., announces the development of an extremely simple and effective grounding wire clamp. This clamp, listed as standard by Underwriter's Laboratories, is designed to encircle the ground rod and securely bind the grounding wire directly to the driven member. No solder or heat is required, it merely being necessary to pass the grounding wire into the clamp which has been placed around the driven rod, then tighten by means of a set-screw actuated by a set-screw wrench. So securely does this simple little device clamp the wire to the driven member, it is asserted, the wire is flattened against the rod thus increasing its contact surface and eliminating the possibility of slippage.

New Adjustable Spray Gun

The Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill., announces a new "Lo-Hi" multiple-head, pressure-feed airbrush which, according to information supplied, will operate satisfactorily on air pressures from as low as 6-lbs. up to 100-lbs., depending upon the nature of the materials used, the finish desired, and other conditions affecting operations.

The new spray gun is adaptable to a wide variety of requirements.

The accompanying illustration shows five different types of interchangeable caps or nozzles which can be fitted to the end of the



New spray gun attached to cup. Notice the five different styles of nozzles.

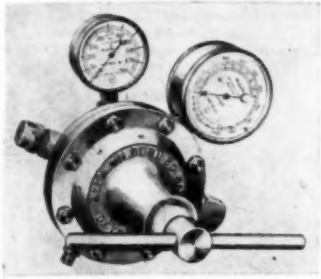
gun to adapt it to a wide range of work. By simply switching an aircap or multiple-head, the new gun furnishes as many as 55 different working combinations.

More complete and specific information on this new spray gun is revealed in an illustrated bulletin being sent out by Paasche Airbrush Co.

New Pressure Regulator

The new "Super Master" regulator announced by The Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md., and illustrated herewith, has been designed to supply the demand for a regulator for use in operations where a large volume of gas or oxygen, or a great number of outlets are to be controlled.

Gas, such as oxygen, which is compressed in cylinders up to approximately 2000-lbs. per square inch for welding and cutting purposes, has to be delivered at reduced pressure ranging from



The regulator with gauges attached.

several ounces to several pounds per square inch. For industrial purposes, it is necessary to give a large flow of gas at continuously-uniform pressures in a dependable manner.

The bonnet is of sturdy bolted construction. An added feature is a safety blow-off valve. The diaphragm extends to the outer circumference of the regulator and is secured by the same bolts which secure the bonnet. The "Super Master" regulator is equipped with 3000-lb. initial guages and 500-lb. delivery gauges.

Continuous Flammable Vapor Indicator

According to a 4-page bulletin recently published, "frequent explosions of japan ovens prompted the Association Factory Mutual Fire Insurance Companies to design a satisfactory indicator for flammable vapors which has been developed commercially in co-

ZELLAC

Can You Reduce Your Production Costs?

Finishing is an important part of your production. Production costs cannot be reduced by cheap materials --which only add to your troubles! You've got to have excellent quality --but quality at a lower price -- if you want to show a substantial gain.

Beauty, durability, and the right colors-- these sales-making factors depend on quality, too! From the standpoint of both salability and better, more economical production, Zellac quality and Zellac prices mean new life to your business.

And incidentally any and every finishing need you have can be fulfilled by our complete line of every known type of lacquer materials.

Put these statements to the test! Let us deliver you a trial order of Zellac formulated on the basis of our experience as lacquer makers since 1886--specially formulated to whatever requirements you wish to send us. You can then obtain uniform supplies of Zellac on that special formula. And you'll be just as agreeably surprised by the prices that we will quote as by the quality that your tests will reveal.

Zeller Lacquer Mfg. Co., Inc.
Zeller Building
20 East 49th Street New York City

Stockrooms and Offices at:
Chicago: 551 W. Lake St. *Los Angeles:* 786 Ceres Ave. *San Francisco:* 1039 Harrison St. *Denver:* Ormor Sales & Supply Co. 503 Fourteenth St. Distributors. *Wichita:* Ormor Sales & Supply Co.. 452 N. Main St. Distributors. *Seattle:* 2108½ First Avenue. *Portland:* 403 Hoyt Street. *Dallas:* Ormor Sales and Supply Company of Texas 408 North Lamar Street, Distributors.

ZELLAC

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A-LAC-O LACQUERS

for all Industrial Purposes

Regardless of how exacting your lacquer requirements may be, there is one of our products which will give complete satisfaction, or we will have our Industrial Engineering Department work out a special lacquer for your purpose.

If you demand a combination of Durability, Elasticity, Non-porosity and Adhesion, you will find that Alaco Lacquers possess all these things. Yet they contain no benzol, benzine or other cheap diluents.

On Wood or Metal they work equally well. Write us for complete information and color chart.

Lacquer Enamels, Surfacers and Primers Clear No-Tarnish and Wood Finishing Lacquers.

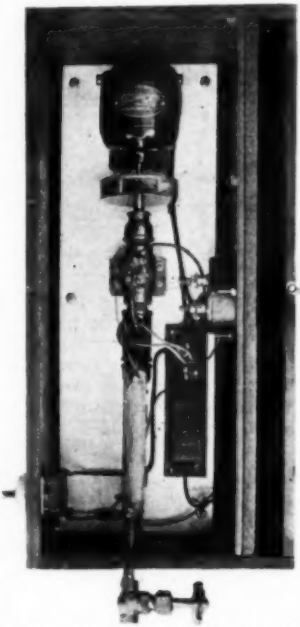
ATLANTIC CHEMICAL CO.

Manufacturers of High Quality Lacquers for 18 Years

Irvington, N. J.

ATLANTIC CHEMICAL CO. Lacquer A-LAC-O PRODUCTS IRVINGTON NEW JERSEY

operation with the Mine Safety Appliances Co., Braddock Ave., and Thomas Blvd., Pittsburgh, Pa. This co-operation has produced the F-M Continuous Flammable Vapor Indicator, as shown in the accompanying illustration. This is an instrument for continuously in-



Interior view of portable box in which the instrument is mounted.

dicating the degree of inflammability and proximity to explosive conditions of combustible gases and vapors in air.

"The immediate cause of such explosions may be quite different in one case than in another, but it is a fact that vapors of inflammable liquids cannot explode when mixed with air and present in percentages less than a definite amount (commonly referred to

as the 'lower explosive limit'). Consequently, the fundamental cause of all such disasters can be attributed without error to insufficient ventilation."

In operation, "the sample is led continuously to the apparatus where it passes through" certain devices by means of which it acts upon a millovoltmeter the readings of which "give a direct indication of the percentage of explosive mixture in the sample under test."

New Asphalt Chromate Paint

A radical departure from former methods of manufacturing asphalt paint has been announced by the Paint and Varnish Division of E. I. du Pont de Nemours & Co.

The basic difference between the usual way of making asphalt coatings and "asphalt chromate emulsion" is that instead of using solvents to reduce the asphalt to the proper consistency, with consequent loss, in part, of certain essential properties, the new process involves the emulsifying of the asphalt by the addition of water and the introduction of chromium salts, which possess the property of making ferrous metal "passive" to corroding influences. The use of these salts is for the purpose of protecting the coated surface from the action of the water of the emulsion until it has dried out.

Among the merits claimed for asphalt chromate emulsion is that it may be applied by brush or a spray gun to either dry or wet surfaces, and that its use in confined spaces is free from danger, as it gives off neither toxic gases nor explosive vapors.

Wide application of this new asphalt compound is predicted in its use for coating underground pipe lines and structural steel. Other

prompt shipments

No Substitutes--

The Geo. E. Watson Company is known to painters everywhere as a reliable painters' supply house. Orders are carefully filled, and substitutions are not made without your approval. There are no delays.

In our 116 page catalog you will find everything needed in a modern finishing shop. Send the coupon today.

Our No. 863 Camel's Hair Color Brushes are made by an expert from selected gray butt, black tip hair and guaranteed absolutely pure.

Width	Length	Dozen	Each
½ inch	1 inch	$3.00	$0.30
1 inch	1⅛ inch	4.50	.40
1½ inch	1¼ inch	7.05	.70
2 inch	1⅜ inch	10.27	1.00
2½ inch	1½ inch	13.87	1.35
3 inch	1⅝ inch	17.85	1.75
3½ inch	1¾ inch	22.12	2.20
4 inch	1⅞ inch	26.85	2.65

Prices are Net F. O. B. Chicago

Geo. E. Watson Co.
"The Paint People"

164 W. Lake Street Chicago, Ill.

Please send me your catalog No. 48 on painters' supplies.

Name.....

Firm.....

Street Address.....

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IF8-Gray

Give it a Trial!

Spray, brush or dip; note the effect of a rubbed varnish job.

You will be pleasantly surprised that such a finish is available; just what you have been looking for to meet present demands. A lacquer hard, tough and lustrous -- economical to apply -- requires little sanding -- long lived -- with the final touch of a rubbed varnish job.

Furniture, radio cabinets, fixtures, toys, etc. of many of the leading manufacturers are now finished with FINISHEEN. Give it a trial!

The Marvelous New Finish for Furniture is —

"Finisheen"

A working sample will easily demonstrate. May we send it TODAY?

THE
MARX & RAWOLLE
CORPORATION
Est. 1849

125 Ann St. Chicago — **551 Fifth Ave. New York**

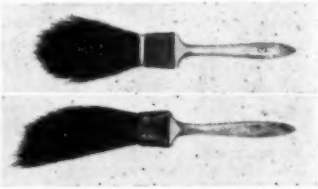
Manufacturers of

VARNISHES—LACQUERS—STAINS—ENAMELS—SHELLAC

uses for which it is intended include numerous industrial purposes, wood preservation, and its employment for certain marine and railroad work where the deteriorating effects of salt water and gases must be guarded against.

New Lacquer Striping Brushes

The Gem Striper Co., 1541 Ilene Ave., Detroit, Mich., announces several new striping brushes which have been especially developed for use with lacquer. Both



Dagger striping brush above; sword striping brush below.

the dagger striping brush and the sword striping brush, illustrated in the accompanying cut, are made in two types, each of which is available in several sizes.

Portable Electric Mixer

The Alsop Engineering Co., 47 W. 63d St., New York City, has developed, for industrial use, a new directly-motored portable mixer which has an attached clamp for fastening the device to a cross member or to the outside edge of a container into which the propeller may be inserted to agitate finishing liquids such as stains, filler, etc.

The shaft on all models, except the very smallest laboratory model, carries two propellers, the

blades of which are opposite in pitch, this giving the "push-pull" arrangement indicated by arrows in the accompanying cut.

Quoting from the six-page descriptive bulletin: "The most difficult mixing problems are solved because the liquids or solids on

Two propeller blades of opposite pitch give agitation in the direction shown by arrows.

the bottom of tank are thrown up by the lower propeller and must mix with the liquid forced down at great speed by the upper propeller. The top propeller which pushes against the liquid has an extra pitch sufficient to carry the weight of the shaft, propellers and motor armature, thereby relieving the motor of all strains. As a result of this unique feature, all the power generated by the motor, is used for agitating the liquid.

"Solid acid-resistant shafts with full double-propeller adjustment are supplied on all standard 'Hy-Speed' mixers."

The smallest mixer is equipped with a 1/10-h.p. motor and rotates 1750-r.p.m. The shaft can be adjusted from 13 to 22-in. to fit different size containers. This machine operates from an electric light socket.

Other models are larger and are equipped with 1/4, 1/3 and 1-h.p. motors respectively. Still larger mixers are driven by motors rated from 2 to 5-h.p.

The Blue Knight's Column

I read a paper at the Platers' convention a few weeks ago. The subject was flexibility and I had various samples to illustrate the points I was making. If you would like to see these samples I'll send them to you.

There are several types of flexibility: Flexibility with considerable toughness and little or no adhesion; flexibility without toughness but with adhesion; and again there's temporary flexibility with temporary adhesion. A fourth class has permanent flexibility, permanent toughness, permanent adhesion.

In this fourth group I have a lacquer No. 1510, available clear and in all colors, that has a toughness so durable that it can be readily buffed with ragwheel and limestick. You can bend a brass sheet lacquered with it in one place, any number of times 'till the metal cracks, but the finish will not chip or flake. Stamping and drawing operations do not affect it.

A simple method for determining whether a lacquer will stand stamping and drawing is to place the finished piece in an acid copper plating bath, then rinse dry and examine for copper deposited on the lacquer face. If the color of metal makes it difficult to detect, dip the piece in a cold sulphide solution and the black copper sulphide will be readily detected if the lacquer film has failed.

A convention note struck by practically every one of the speakers . . . . "if a lacquer salesman can show you something really new, different, listen to him and save any one of the ten accepted stalls known to all lacquer men, for the blarney-artists who make no pretense of studying your requirements and who show absolutely no consideration for either your superior knowledge of lacquers or your time."

The Blue Knight

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New Portable Spray Outfit

Kellogg Mfg. Co., Rochester, N. Y., announces a new portable spray outfit, "No 1," which includes compressor, spray gun and

hose—all weighing less than 36-lbs. The compressor is driven by a universal motor which will take power from a 110-volt lamp socket.

The spray gun is the Kellogg "All Round" Model A, especially designed for general purpose service. The compressor is the Kellogg EM-281 UX, weighing only 33-lbs and incorporating such features as patented lubrication by pump and splash, oversize bearings, leak-proof rings, etc.

Mechanical painting has been universally accepted by industry as the most economical method of maintenance painting and product finishing.

Air Filter Bulletin

The Stay-New Filter Corp., of Rochester, N. Y. has issued a new 24-page booklet which describes and illustrates Protectomotor air filters for use at the intake pipes of air compressors, automobile engines and for numerous industrial uses where it is necessary or desirable to clean the air furnished for certain kinds of equipment, operations and processes. This company also manufactures panel air filters for use in connection with the ventilation of buildings.

Dip Finishing: Mechanical Striping

Foreman finisher in musical instrument factory explains the methods and equipment developed for dip-finishing and mechanically striping the wooden hoops used on toy drums

By James E. Lees

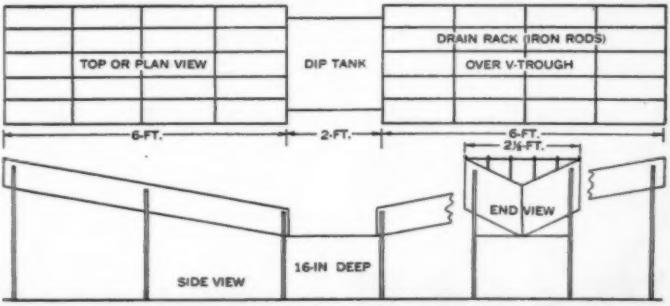
THE work I have charge of includes the dip finishing and mechanical striping of wooden hoops that go on toy drums. These hoops are made of gum; they are ⅛-in. thick ⅞-in. wide and range in size fom 6 to 14-in. in diameter. We use an alcohol-base filler for black and red enamel finishes and natural wood finish. The reason for using alcohol is to speed up drying.

I think the big trouble most concerns find in using these materials is that they put them on too heavy. Another big trouble is that some foremen don't study their work to learn how to produce satisfactory results economically. Some users of finishes do not buy their dipping and brushing materials heavy enough in body. For instance, I have mine come with a Baume test of 20, using it cut down to 28. My reason for this is that I can thin any material down but, if it comes too thin, I can't build it up. I use my fillers just as thin as I possibly can for a smooth finish, but I use my varnish a little heavy.

Dip Tank; Drain Racks

The dipping tank, drain racks and troughs I use are illustrated in Fig. 1. The tank is lined with galvanized iron soldered at the joints. Above each V-shaped drain trough is a draining rack made of ¼-in. round iron rods, which can be removed for cleaning. For enamel dipping I use drain troughs 6 to 8-ft. long, as shown in the drawing, but for varnish dipping I add another 6-ft. section to each trough to double the length of the trough and rack—this to allow double the length of time on the rack for varnished hoops.

The idea of having a drain rack on each side of the dip tank is to provide an arrangement whereby the operator can fill one rack and leave it undisturbed while he fills



Plan, side and end views of drain racks and V-troughs which extend outward from opposite sides of the dipping tank. The drain rack above each V-trough is made of ¼-in. round-iron rods, which can be removed for cleaning.

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Jamestown Wood Finishing Co.
Jamestown, N. Y.

the other. By the time the second rack has been filled, the finish on hoops on the other rack as set sufficiently to permit the hoops to be removed. In using gum wood which has been rotary cut (not sawed) I believe I am working one of the most difficult woods there is to fill.

Our method of dipping is to string 20 hoops at a time on a slender round-iron rod which has a handle and hilt something like a sword. The operator dips this into the tank, holding the handle lower than the tip and turning it to revolve the hoops so that every portion of the surface of each hoop gets a coating of finishing material. With this same dipping rod, the dipped hoops are transferred to the draining rack over the drain trough and laid to rest with one hoop overlapping another like shingles on a roof.

Racking the Hoops

Hoops are laid out along the far side of the rack first, and then along the near side to finish filling the rack. As the second row of hoops are laid, the dipping rod is passed along the middle of the rack—directly above the V in the trough—so as to prevent drippings of finish from dropping onto hoops already lying on the rack. With this dipping and draining equipment, one man will dip 3000 hoops in enamel and 3000 hoops in varnish (total 6000) in a 10-hour day. Formerly it required four men to do the same amount of work in the same length of time.

When we remove hoops from the drain rack, we stack them in overlapped formation (as in laying shingles) on factory trucks, getting about 720 hoops on each truck. Laying the hoops this way, we can store a large number in small floor space, getting about 20,000 finished hoops (on trucks)

in a floor space of about 30x30-ft. Usually they are left to dry 48 hours, although sometimes we use them after only a 24-hour period of drying.

Mechanical Striping

Women remove the hoops from the trucks and do the striping by machine. For 20 years the company had been trying to work out a way to stripe these hoops by machine, instead of permitting the work to be done by the old-fashioned, slow hand method. Eventually we developed a method of doing this by machine and now two girls—one of them working only half time—do as much work as four to six girls formerly did.

A diagram, which I hope will show how our striping machine works, appears in Fig. 2. Referring to this diagram, the striping fluid feeds from the fountain to the composition (rubber and glue) roll *A* and transfers itself onto two oscillating rolls marked respectively *B* and *C*. These oscillating rolls act as "distributor rolls"—if we may borrow the term from the printing trade. From the distributor rolls the striping liquid is transferred to a brass wheel *D* —the striping wheel— which is 3-in. in diameter and ⅛-in. across the face for a ⅛-in. stripe.

Now it isn't practical to stripe hoops directly from the brass striping wheel, so we use what printers and lithographers term the "offset process." We put in a solid rubber wheel (1-in. thick or wide by 8-in. in diameter) between the brass striping wheel and the roll *F* that carries the hoop to be striped. As a result, the stripe is transferred from brass wheel *D* to the offset roll *E* and then "printed" directly on the wood hoop.

Hoops are put on and removed from roll *F* one at a time by hand.

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This roll has a ¾-in. flange, and the edge of each hoop is placed against the flange to make the hoop revolve true, and to properly space the stripe at a uniform distance from the edge of the hoop.

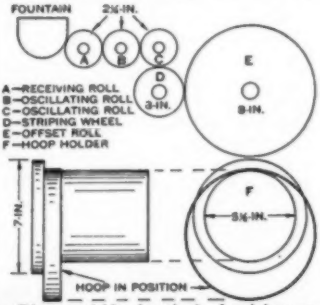

Diagram (side elevation) of striping machine for printing a stripe on enameled and varnished wood hoops for toy drums.

The striping fluid passes from the fountain to the composition roll "A" and is transferred by oscillating roll "B" and "C" to the brass striping wheel "D," which is the width of the stripe desired. The fluid then transferred to the solid rubber offset roll "E," which prints it directly onto the hoop carried by flanged wheel "F." In operation, the workman raises and lowers flanged wheel "F" by a convenient pedal as he stripes and changes hoops.

The flanged steel wheel *F* is mounted in such a way that hoops can be slipped on and off quickly and the wheel can be raised and lowered by a pedal to make and break contact with the offset roll *E*. Contact with the offset roll is what makes the hoop-holding roll *F* turn and as it turns, the hoop receives its stripe. This striping machine is gear driven and it works satisfactorily.

For gold striping I use a well-known grade "XXX" extra-fine gold bronze, mixed 11 parts of bronze to 9 parts of varnish by weight.

An exhibition which shows new things attract the interest of the public.

Color Decoration by The Screen Stencil Process

First installment of a two-part article which tells how to design, make and use the new screen stencils for applying single and multiple color decorations on furniture and other articles

By C. F. Merrifield

DURING the last few years, a new process has come into use for making signs, window displays, show cards, advertising matter, tire covers, decorations on furniture, card-table covers, pennants, dress goods and many other products. By this process—which produces results second only to high-priced hand work—practically any number of colors can be laid on a design, using paint materials.

This is the so-called "silk-screen process" with its variations of paper stencils, celluloid stencils, photographic screens, etc. Until recently, the process was used principally for lettering on tire covers, for show cards, window displays and similar purposes. Now it is coming into use on small signs of all kinds, furniture, display racks and many other manufactured articles. Methods are also being devised for the use of this process on large fabricated road signs and billboards.

The process calls for the use of a stencil or screen made of silk, organdy, wire cloth or some similar open-meshed material which is blocked out with paper, shellac, lacquer, celluloid, photographic chemicals or some other material not readily attacked by the solvents in paint.

Paste paints of special composition are forced through such portions of the screen as are not blocked out, by drawing a rubber squeegee across the screen. This forces paint through open meshes of the unblocked portion of the screen onto the cardboard, paper, tire cover, cloth or other surface placed under the screen. The screen is then raised and applied to a fresh surface, and the squeegee is drawn across the screen again. This makes it possible to produce as many impressions as desired, each exactly like the other and each exactly like the original —provided the screen has been carefully and properly made.

Making the Screen

To keep the silk or other fabric taut and tight, it is stretched over a wooden frame before the design has been transferred to the fabric. On small screens to be used over and over again, the fabric is usually tacked down. On temporary screens, to serve for one run only, frames are sometimes used which have a clamping member that holds the fabric taut and permits the screen to be removed and replaced by another when it has served its purpose.

The frame should be of strong well-seasoned wood, and made as rigid and straight as possible. The screen is often hinged on a work table to facilitate ease of register of colors where small flat work is being done. For decorating furniture, the frames are usually held by hand against the surface to be decorated; registering of colors is accomplished by moving

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the screen until the operator sees it is in proper position.

As intimated previously, there are several materials that can be used for making the screens. On the rougher work such as tire covers, etc., organdy blocked off with paper or celluloid is often used. For finer detail work, fine meshed silk like that used for bolting or sifting flour is used; it is blocked off with lacquer, shellac, photographic chemicals or other special blocking materials. Organdy screens of the type mentioned above are made according to a process somewhat similar to the following outline:

The Letters or Design

The lettering or other design is sketched out on medium weight, tough, non-porous paper, similar to that used for wrapping packages. When the design has been completely transferred, the entire face of the paper should be given two coats of orange shellac. The portions of this design which are to be run in one color are then cut out with a sharp stencil knife while the paper is lying on a hard, smooth surface such as glass.

Any pieces completely detached from the paper during the cutting-out process, and which are needed to block out the final design, are carefully marked and saved at the time of cutting out, so they can be fitted into their proper places later. This applies to the center portions of such outlined letters as "O," "D," "B," "P," etc.

A strong wooden frame should be made suitable in size to take the design and leave a good margin on all sides—if one is not already available. When the frame is completed, take a good grade of organdy and draw it tightly over the frame, tacking it securely and free from wrinkles

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or saggy places. Now the design is ready to be transferred to the screen.

Lay the paper pattern on a smooth hard surface, with the shellac-coated side up. Place the frame, with the organdy-side down, against this design and carefully center the letters or design so they are properly placed on the screen. Now take a flat iron which is warm, but not too hot, and press against the organdy on the inside of the screen. This softens the shellac coat and causes the paper pattern to adhere to the organdy.

Now take the numbered parts which are needed to complete the letters or design and place these, one at a time, in their proper position under the screen, according to where they were originally cut from, and press the iron against them to make them adhere to the organdy. When this work is finished the screen is completed, except for running a piece of paper all around the edges of the screen. These edges of the screen should be pulled up tightly against the outside edges of the frame and glued there, to prevent the paste paint from working out through the edge of the screen and causing smeared work.

For Multi-Color Work

The screen just described is for one-color work only. If more than one color is wanted in the complete design, additional screens may be made similar to the one just described—each screen being cut out so that only the portions of the design, which are to be finished in one color, are not covered with paper when the screen is completed. Care should be taken when making the second or third color screens to provide a means of accurately registering one screen with another when

they are used, so as to get a clean-cut, carefully-registered job.

Instead of the paper used in the above screen, sheet celluloid or similar materials can be used if desired. Paper is the most economical material and is sufficiently good for rough lettering and bold designs that have little or no detail. Silk, fine-meshed wire cloth or similar materials also can be used to replace the organdy if desired, but organdy is ordinarily used for tire-cover work and similar uses.

Where the design to be duplicated contains several colors or has considerable detail, instead of using a cut-out stencil as described above, it is better to use fine bolting silk and block out the design with shellac, lacquer or special blocking solutions. In making this type of screen, the silk is tightly stretched over a wooden frame and the frame is then laid over the design to be reproduced. All the portions of the design, which are to be done in one color, are then carefully marked on the silk with India ink, or some other suitable means.

When this is finished, the design is removed from under the frame and the entire surface of the silk, on the inside of the frame, is coated with a blocking-out compound, shellac or lacquer, leaving open only the portions of the silk which have been traced from the original design. Go over the silk with the blocking-out material a sufficient number of times to eliminate any pin holes or skipped places, and let each coat dry before the next one is applied.

Where more than one color is to be run in the completed design, additional screens similar to the above can be made for each colored portion of the design.

(To be continued)

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White Lacquer Enamels

Zinc pigments find very wide use in the lacquer industry. Those most commonly used are zinc oxide (American and French process brands), lithopone, high zinc sulphide, lithopone and zinc sulphide.

White pigments are employed in lacquers, as in other protective coatings, to impart opacity and whiteness, to strengthen and stabilize and to prolong the life of the film. Due to the relatively low binder-volatile ratio of nitrocellulose lacquers, pigments and all other solids must serve their purpose as efficiently as possible.

It is significant to note that in spraying lacquers where less pigment per gallon is used and where, therefore, a demand would seem to exist for higher hiding pigments—twice as much zinc oxide is used as is used in brushing lacquers.

It forcibly illustrates the premium that is placed on such qualities as stabilization, color, brightness, gloss, non-yellowing and mimimum settling properties, which zinc oxide possesses.—W. C. Norris.

Many of the beautiful and distinctive color effects one sees can only be produced mechanically; and, undoubtedly, the only practicable way to finish all of them is mechanically, because of the time element involved, as well as the saving in labor.

Bulletins on Spray Finishing Equipment

Spray-Lac Mfg. Co., (successors to Mellish-Hayward Co.) 5635 Harper Ave., Chicago, Ill., is sending out bulletins which describe and illustrate the present line of spray equipment, including complete portable spray outfits, spray guns, spray booths and pressure containers.

Finishing Piano Plates

Calling attention to some of the problems involved in finishing piano plates and revealing what materials and methods have survived after considerable experimenting

By T. C. Fenmoseik

PERHAPS the most successful material for surfacing or undercoating piano plates, all features considered, is a good grade of black baking japan. The reasons for this might be summed up as follows:

In the first place, nearly all piano-plate manufacturers serve a considerable number of patrons making different grades of pianos; the makers of very high-class pianos are willing to pay for, and they require, finely-finished plates, whereas those making cheaper pianos do not require —and will not pay for—such high-class workmanship. Thus we find, in some cases, plates are finished with one or two coats of black japan, which is given very little attention other than baking.

Where it is desired to bring up a plate to a high state of perfection, the first coat of black baking japan is followed by a knifed-on filler to fill up imperfections in the casting; after it is sanded down, this is followed by further coats of the japan, which are rubbed or "stoned down" with water to bring it to a surface. Those to be finished in the very best style are rubbed down and recoated until a glass-like surface is obtained.

After the smooth surface has been secured the proper ground coats are applied, some differing as regards the color of the final finish. Some are finished in plain bronze and also "Vernis Martin," which is the same gold bronze coated over or glazed with varnish lightly colored with a transparent yellow lake (dye). This produces the rich golden effect so often seen on bedsteads, computing scales and picture frames. Other plates are finished in dark green, plum color, or whatever prevailing colors happen to be popular.

Yellow Undercoats

Several years ago the demand arose for developing a satisfactory system of undercoating, as in a yellow color which would lend itself readily to producing a finish in gold or bronze, because of the fewer coats required to cover it, and also because it would not show blemishes, particularly where the finish is so likely to be chipped out, as around the steel wire pegs that are driven in after the piano plate is finished.

The idea was all right, for should the finish get chipped at any place it would not show black underneath, as occurs when the plate is surfaced with black japan. However, theory does not always work out in practice, as happened in this case. After repeated attempts to install this system in some of the larger plants, many difficulties were encountered.

In the first place, the paint undercoatings required higher class workmen to apply and handle in every way, than had been necessary with black japan. This is a real difficulty in the average factory making piano plates, because the work is very heavy and unpleasant, consequently certain

types of workmen are unusually difficult to secure.

Another drawback appeared in cases where it was desired to finish plates cheaply with a minimum number of coats. Whereas, cheap plates can be finished with one or two coats of black japan and still appear presentable, the system of yellow paint undercoatings required several more coats, and increased the cost to a point where it was prohibitive insofar as the cheaper plates were concerned.

Thus it will be seen that the piano plate manufacturer is brought to the point of having to use black japan for all of his plates, or use black for the cheaper grades and color undercoating for the expensive ones—and this in itself causes complications which, in most factories, are prohibitive.

Quality and value are the two things to keep constantly before you—high quality and good value. The best in anything at a fair price is the best value. A workman can't do good work with poor tools, neither can a merchant gain a good reputation with poor goods.

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Finishing Metal Furniture

Summarizing the finishing materials, methods and schedules employed in each of four distinct classes of finishes for metal furniture

By W. J. Sealbright

THE SUBJECT title of this article embraces a large and important industry, and as might be expected, the various lines or branches of the business entails varying methods of finishing—necessitated by their respective shop conditions or facilities, the type of finish customary on the different products and in some cases by limitation in cost.

For this reason the subject will be presented more as a summary of general procedure, rather than as a definite system applicable to any one particular factory. This restriction is obviously necessary when it is realized that the range is too large to be anywhere near covered within the scope of a single article of moderate length.

Usually the parts or sections are either dipped or sprayed for undercoating and, if it is not left in a final coat of straight color, the exposed surfaces are grained by hand or machine and finished with clear varnish sometimes brushed on, but usually sprayed.

For convenience, the work will be divided into four types, each division to represent essential features of methods ordinarily followed.

Grained Work of Best Grade

One coat of primer, applied by brush or spray gun, and then baked four hours at 180-deg.F. The primer should be furnished ready for use to avoid any tampering with it in the shop; that is any changing from the way it is supplied by the manufacturer.

Next comes the ground coat, which some users procure in semi-paste or heavy consistency and reduce suitably for use. This must be made of material ground very fine. Flow this out smoothly and cover the surface solidly; then bake three or four hours. After being baked, this finished surface is sanded lightly to remove all fine nibs so these will not show through the final varnish coat.

As an illustration of radical departure from the foregoing, it may be cited that one concern enjoying a large business of this kind, regularly uses a mahogany ground of quite heavy body which is still of good consistency, after being reduced 10 percent with a naphtha like "Varnolene," for spraying. This is baked only one hour at 280-deg.F., and although it is fully baked in this short time and at this low heat, the coating is tough and allows bending and rebending and also folding over flat without any cracking on the folded edge.

The graining color is generally in paste form and is reduced with turpentine to rather thin consistency. It is applied and blended by hand—or the graining may be done by imprint from pattern and roller. This coating is baked 3 hours at a temperature of 180-deg.F. Some concerns prefer distemper color for graining and, of course, that eliminates one baking. Graining colors in oil are advisable.

The first coat of varnish is brushed, or sprayed and baked 4 to 5 hours at 180-deg.F.; then it is

rubbed down with powdered pumice stone and water.

The finish coat of baking varnish will be left in the gloss or rubbed. Sometimes rottenstone is used instead of pumice stone, when less flatness is desired. This also leaves the surface freer from scratches than when pumice is used. Similarly, oil instead of water can be used for the rubbing vehicle.

The imitation of each different wood is carried through in practically the same manner, the difference being in the color of the various materials, and the graining. However the ground color for bird's-eye maple is white and ready for use, and is usually grained with distemper (water) color. Varnish and baking produce sufficient color to make the ground correct.

Quality Solid-Color Finishes

The primer is generally reduced about 25 percent for dipping work; the parts are given one coat, drained well and baked 3½ hours at 180 to 200-deg.F. The primer is always an approximate match in color for the enamel to follow, so that this one coat will suffice for the interiors or parts not always in view. Dipping also assures a thorough coating of the metal at all points, protecting it against rusting. The primer is sanded lightly on all exterior surfaces.

Next, one coat enamel dipped or sprayed—preferably sprayed—and baked 3½ hours at 180 to 200-deg.F.; then this is rubbed down with powdered pumice stone and water. Striping or transfer is applied and, when dry, the final coat of finishing varnish is brushed or sprayed on. Then it is baked 3½ hours at 180 to 200-deg.F. This may be left in the gloss, or rubbed with fine pumice stone or rottenstone and water or oil according to the resultant texture and sheen desired.

Nearly every manufacturer uses something a little different in rubbing oil, but the need is very simple and about as good a vehicle as any, is common paraffin oil, with a small addition of kerosene to cut the body of the other.

Less Expensive Finishes

The third group comprises the same materials and procedure throughout, but without final finishing with varnish, and probably without any striping or transfer decoration either, because varnish is the main protective coating for both.

This class of finish is left in the enamel gloss, or rubbed with fine pumice stone or rottenstone, using water or rubbing oil according to the degree of finish desired. Dull finish is more commonly furnished and really it is more satisfactory from the utility standpoint, as it doesn't mar, or scratch so readily. In this case pumice stone and oil is to be recommended.

The fourth type of finish is used in finishing metal lockers and other articles, where a higher type of finish is neither necessary nor sufficiently economical from the veiwpoint of the manufacturer.

Various grades of materials are used; the lower-priced goods are either air-drying—usually in 18 hours—or baked 2½ hours at 160-deg.F. Also these would likely have to stand about 20 percent reduction for dipping or spraying. Brushing would be too expensive. Furthermore, in most cases, the manufacturer demands strong covering goods for one-coat work. On this account color is a big factor and dark olive green is popular because of its hiding power or strength.

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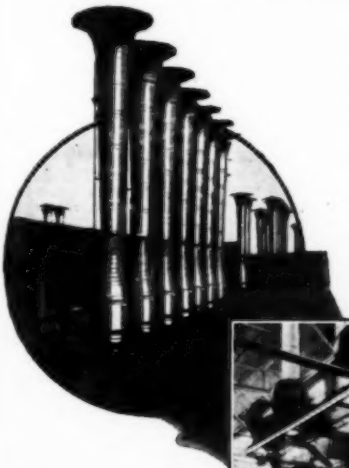

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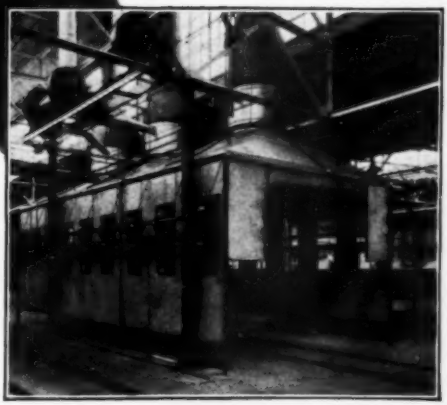

At the right is a typical example of a Mahon Spray Booth, designed for simultaneous painting of both sides of double-deck busses on production line. Upper photo shows exhaust stacks through roof line with motor and fan equipment located outside the building as a fire preventive measure.

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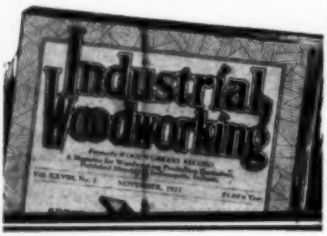

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Before the advent of mechanical painting and finishing equipment, the finishing of an article was the long and tedious end of manufacturing; now, with the rapid-drying finishing materials on the market, and an efficient mechanical painting equipment, the finishing process is accomplished in minutes, when it formerly required hours.

Henry V. Walker Co., Activities

The Henry V. Walker Co., 17 John St., New York City has recently moved into much larger offices in the Tyler Building, and has established a western branch in Cincinnati, Ohio. The western branch is in charge of Mr. W. S. Elwin, a veteran of over 25 years experience in the lacquer and enamel business.

Industrial Arts Show

Industry in all its branches will be featured prominently in the Industrial Arts Show of the Eastern States Exposition from September 16 to 22 inclusive, the display of machinery, manufacturing and industrial products being one of the major divisions of this national exhibition at Exposition Grounds, West Springfield, Mass.

Du Pont to Furnish Cellulose Acetate

It is announced by the E. I. Dupont de Nemours & Co., Inc., (Chemical Products Division, Parlin, N. J.) that this company has just taken over from the Rhodia Chemical Co., of New York, the exclusive sales agency for cellulose acetate as produced by the Societe Chemique Usines du Rhone of France.

Later, it is expected that the DuPont Co., will be in position to furnish cellulose acetate manufactured in the U. S. under the patents and processes of Societe Chemique Usines du Rhone.

Bulletin on Clean Air

The Reed Air Filter Co., 215 Central Ave., Louisville, Ky., is sending out a new bulletin which emphasizes the need of clean air, and which describes and illustrates air filters for air compressors, oil engines, warm air furnaces and for electrical and general ventilation.

Straw Hats, Fiber Hats Lacquered

Lacquer authority explains why nitrocellulose lacquer has replaced glue sizes in the straw hat and fiber hat industry, and reveals interesting information about methods of using it

By Dr. S. P. Wilson

FOR MANY years, straw and similar fibers used for all shapes of women's millinery were given the requisite stiffness to make them hold their shapes, by the use of animal glue sizes. The hats were dipped in a solution containing different amounts of the glue in accordance with the degree of stiffness desired, then drained and allowed to dry overnight in a warm room. This put them in condition to be placed on the hat block to be pressed into shape.

Within the last two or three years, glue has been almost entirely displaced by pyroxylin lacquer sizes and, during the season for this type of millinery, large quantities of lacquer size and thinner are used in this industry. Naturally, the cost of lacquer is much greater than that of a water glue solution and in this industry no fraction of a cent is spent unless there is good reason for it.

Advantages of Lacquer Size

The advantages of a lacquer size are many. The trend to delicate pastel shades, especially on new fibers such as visca, demands a size that is practically water-white. Almost anything would go on a black straw hat, but for the present hues only a good pyroxylin lacquer is sufficiently colorless. Second, the tautening and stiffening power of pyroxylin is unequalled, as shown by the widespread use of pyroxylin dopes on airplane fabrics.

A much smaller weight of pyroxylin is required to give the stiffening power of a given amount of glue and this results in a lighter, airier and less logy-looking hat. In production, there is the added advantage of greatly increased speed, as the dipped hat is dry enough to block the same day. This is of particular value to the hat industry where the season is short and where speed is essential in filling orders. Another important point in favor of lacquer is its waterproof qualities, in which it surpasses glue, shellac or other gum solutions.

Formation of "Windows"

The formulation of a good hat lacquer size is not as simple as it seems. The choice of a proper grade of nitrocellulose is very important, for although those of highest viscosity have the best color and the best stiffening and shrinking power, they are also the hardest to handle and more likely to give the effect called "windows"—those bright glossy spots in the hat where the lacquer has filled a pore and dries in such a way as to produce a tiny window-pane appearance. While a few of these always appear in production, some lacquer sizes are more liable to cause them than others. The presence of many of these windows will cause a hat to be rejected.

Choice of Solvents

The choice of solvents is also important. They must be blush-

resistant, as otherwise the hat would be fogged and whitened on humid days, yet they must evaporate quickly enough to allow handling and packing in a very short time.

A trouble encountered when the wrong solvents are used is the strong residual odor present when the shipping cases are opened at the store. In confined spaces, there is little chance for evaporation and more than one shipment has been returned for this cause.

Since hats are generally finished by dipping and since the operator must handle the lacquer and breathe its fumes continually, the use of poisonous solvents such as benzol and wood alcohol would seem inadvisable, yet there is no question but that these toxic solvents are used in some hat lacquers. In this connection it may be said that many hat factories are poorly ventilated and considerable trouble has been caused by the pronounced odor of lacquer, even when no really toxic solvent is present. Many workers are unusually susceptible to some of the odors present, and complaint or illness is frequent on this account. Modern developements indicate that an almost odorless lacquer could be produced for the trade at a slightly higher price.

Hat Finishing Process

The actual finishing of womens' hats is not particularly complicated. Straw, hair, visca (an artificial fiber on the order of rayon) and paper panama (a twisted paper fiber) are used. The hat is dipped in water dye of the desired color. After drying, the hat is dipped in lacquer reduced to the required consistency, which is obtained by thinning it with lacquer thinner in proportions of from one-to-one, to one part lacquer and two parts thinner. Sometimes the crown and brim of the hat are given separate dips in two different solutions, the heavier lacquer giving the stiffer finish.

Earthenware bowls, glazed inside and out, and holding two or three gallons of material are used. The dipped hat is allowed to drain, or sometimes is slapped on to a moderately absorbent sheet of paper. After drying for several hours on racks, the hats are brought to the blocks which are usually made of plaster of paris or soapstone, and heated by steam. Here they are pressed into shape and made ready for the trimmers.

Spirit Varnish for Gloss

Some types of hats are finished in a high gloss and spirit varnishes are widely used over lacquer size. Lacquer itself does not give a sufficiently high luster for the tastes of the trade. A heavy high-gloss spirit varnish, or shellac or a low-priced spirit gum varnish, is brushed on the outside of the hat.

None of these varnishes, so far as I know, is waterproof and the spotting of varnished hats in the rain is a frequent occurrence—particularly on the darker shades like black or navy blue. A thin coat of lacquer over the varnish, or the use of a mixing lacquer with it might add water-resisting qualities, but I do not believe this is being done.

A somewhat different type of lacquer is used on panama hats made from paper fiber. These hats would be seriously damaged by a rain and are often protected by a dip coat of lacquer, which is made glossier and much more flexible than the type mentioned previously. The requirement here is for suppleness rather than stiff-

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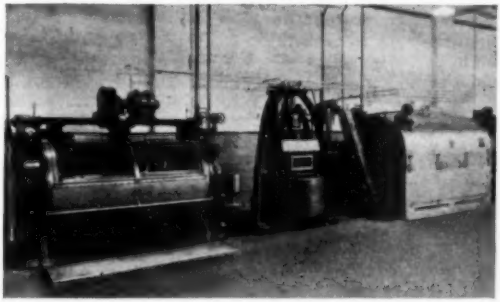

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ness and an entirely different material is used.

Baking White Enamels

Considerable trouble is often experienced in baking white enamel on metal surfaces. So many finishers expect to get a smooth even finish by the application of two coats—one of primer and one finish—and then they try to rush the work through.

The surface to be covered must be considered. If it is a cast metal and is porous, the surface must be filled; otherwise each succeeding coat will show pits or depressions.

A heavy coat of good quality white enamel should be baked on, sanded down, and a second coat applied. Then the third coat of finishing white baking-enamel should be applied and baked at not over 150-deg.F. A higher heat is likely to turn the white to a cream or ivory.—C. D. Y.

How to Mix and Use Wood Fillers

Instructor of Wood Finishing classes at the Grand Rapids Vocational and Technical High School submits information about fillers and filling practice. Further comments are furnished by a practical foreman finisher

By R. F. Daniels

FILLERS are used by all expert wood finishers, to fill the pores of the wood to be finished. Woods that are open grained such as butternut, chestnut, mahogany, ash, walnut and oaks of all kinds, should always be filled. Close-grained woods such as birch, basswood, cedar, cherry, gum, maple, poplar, etc., do not need filling.

Ingredients of Wood Fillers

Since there are many different fillers now on the market, I believe it is advisable to name some of the principal ingredients used in the making of fillers. Hard pulverized silica, whiting, china clay, silver white, silex, or ground soft rock are ground in linseed oil, thinned with turpentine, naphtha or other thinners, and mixed with the proper coloring matter to give the desired color.

Several good wood fillers, now on the market, are ready for use when purchased. There are also fillers prepared and sold in paste form which can be made ready for use by simply thinning the paste to a consistency of between 10 to 12 lbs. of paste filler to a gallon of either naphtha or turpentine, or so mixed that the greater part of the filling qualities will penetrate into the pores of the wood and still leave enough pigment on the surface to rub into the pores of the wood if the filler has not penetrated into them.

Filler Drying

Filler can be made to dry harder and faster by adding japan dryer to the paste mixture, after thinning ready for use. The amount usually used is about one-half pint to a gallon of filler; of course, the amount of japan used usually depends on the temperature of the room. If a finisher prefers to have

his filler dry more slowly, he can get results by adding linseed oil to the filler mixture. The amount of linseed oil will also have to be governed by the temperature of the room where the filling is being done.

A finisher should always bear in mind that the more time filler is allowed to dry in the pores of the wood after wiping and before coating, the better results he will get. Where possible, it is recommended that the filler dry at least 24 hours, although some factories coat after 12 hours and get by with it. Also, bear in mind that the filler should be kept thoroughly agitated while in use; otherwise the ingredients used in making the filler will settle to the bottom, leaving only colored oil on the surface.

Methods of Filling

In the filling department, it is well to arrange things so that one man applies the filler either with brush or spray gun. After the filler has been applied, and as it dries, it begins to turn gray or flat. When the filler has all turned flat, it should be pressed into the pores of the wood by gently rubbing across the grain first, and then with the grain. Tow, sea moss or waste is generally used in this operation.

The next operation is "picking" —using a sharp-pointed dowel to pick out all surplus filler from the inside corners, etc.

Brushing, which is next in order, is done with a "filling brush" or hard-bristle brush. The object of this operation is to brush out the filler from all carvings, corners etc.

The last operation is to wipe the surface clean with a clean cloth. If the above operations are carried out in the manner named, the finisher should have a good, clean, filling job.

Using Men Effectively

Where several fillers are employed, I find that it is more efficient to have one or more men apply the filler and then pay a certain price per piece. The wipers or cleaners should be paid separate, at a piece price, so that each man can work according to his ability.

Formulas for making fillers.

Filler for Walnut

Burnt umber in oil	1-lb.
Burnt sienna in oil	¾-lb.
Linseed oil	1-pt.
Naphtha or turpentine	1-qt.
Japan dryer	½-pt.
Silex or whiting	11-lbs.

Filler for Mahogany

Silex	11-lbs.
Rose pink in oil	1-lb.
Linseed oil	1½-pt.
Van Dyke brown in oil	1½-lb.
Asphaltum	¾-lb.
Japan dryer	½-pt.
Naphtha	¾-qt.

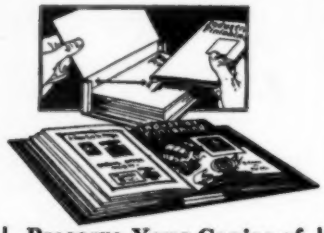
Filler for Rosewood

Silex	11-lbs.
Burnt sienna in oil	1-lb.
Rose pink in oil	1-lb.
Lamp black in oil	½-lb.
Linseed oil	1-pt.
Japan dryer	½-pt.

A Foreman's Comments

Editor's Note: Comments on the above article by a practical foreman finisher, Mr. T. R. Nall (Indiana), follow:

The average finishing foreman knows how to color his filler for different kinds of woods, but there are comparatively few large wood finishing shops where the finisher is obliged to make his own filler. There are large manufacturers that specialize in making all kinds of fillers in different colors and it is neither necessary nor a mark of good judgment for the finish user to make his own filler. The foreman finisher cannot mix filler like the factories that specialize in making filler—where they



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are better fixed for grinding and mixing all the ingredients together.

Where a foreman makes his own filler, he is liable to have trouble, as he may not get it mixed properly; it may cause pinholes and shrinkage. These faults are sometimes laid at the door of the varnish manufacturer, without just cause. Thorough investigation has shown the majority of these troubles to be due primarily to the use of inferior paste wood fillers.

Apply Filler with Brush

I do not think very much of spraying filler, as one cannot do this work justice with a spray gun. This has been proved several times; the filler does not get down into the pores of the wood; it just lies on top and when "grassed off," half of the pores are left unfilled. In this part of the country (Indiana and Kentucky) everyone brushes the filler on. I have tried spraying filler myself and found that brushing is the only way to apply filler.

For Filler Satisfaction

Mr. Daniels also states, in his article, how many pounds of filler to use in one gallon of naphtha. He says from 10 to 12 lbs. of paste filler, which is true for some finishes. The more open the grain, the heavier the filler should be used. I should say 10 lbs. of filler to one gallon of naphtha under-varnish work, and 14 lbs. of filler to one gallon of naphtha under lacquer work. There is a special filler on the market now to be used under lacquer; it is called lacquer filler.

Mr. Daniels has recommended filler to dry 24 hours, and adds that in some factories it is only allowed 12 hours to dry. I recommend it to dry 24 to 48 hours.